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THE RUBBER AGE AND TIRE NEWS

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GENERAL MANAGER
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The Nature of Vulcanization*

By Dr. H. P. Stevens

Two theories have been put forward to explain the change which takes place in the physical and chemical properties of rubber when vulcanized. According to one theory, vulcanization is primarily an adsorption process; according to the second, a chemical reaction is involved, the sulphur entering into a chemical combination with the rubber hydrocarbon. It would, however, appear that those who uphold the physical theory admit the possibility of a subsequent chemical combination of the rubber and sulphur taking place, while the supporters of the chemical theory admit that adsorption of the sulphur may precede chemical combination. It remains to be shown whether or not the technical effect of vulcanization can be produced without any chemical combination between sulphur and rubber hydrocarbon taking place.

The systematic researches of Spence and his collaborators (Koll, Zeits., 1911, 8, 304; 9, 300; 1912, 10, 300; 11, 28, 274; 1913, 13, 265), which in the main have been corroborated by later work, clearly show that sulphur enters into chemical combination with rubber during the ordinary vulcanizing process as, for instance, when a mixture of rubber and sulphur is heated for an hour or two at temperatures such as 130°—150° C. The velocity of the reaction is proportional to the time of heating at a constant temperature; the temperature coefficient normally lies between 2 and 3 (*Ibid*, 11, 32), but is considerably influenced by catalysts (the so-called accelerators).

More recently the subject has been studied by Harries and Fonrobert (Ber, 1916, 49, 1196, 1390) : these authors, without controverting the work of Spence, claim that vulcanization is essentially a physical process and that vulcanized rubber can be prepared which is free from combined sulphur. This conclusion is based on one vulcanzing experiment only, carried out on a rather large scale. The acetone-extracted vulcanizate was practically free from sulphur. In the course of my own work on vulcanization I have made numerous sulphur estimations in acetone-extracted vulcanizates but have never obtained a figure comparable to that of Harries. It was therefore thought advisable to carry out a control of Harries' vulcanization experiment before proceeding with further research.

There are several points in regard to Harries' experimental procedure which are open to criticism. The rubber was mixed with 10% of sulphur and discs vulcanized for a short time (½ hr.) at a fairly high temperature (145° C.). The thickness of the discs is not given but, as these were used for tensile tests with a Schopper machine, they were probably 5—6 mm. thick so as to give a ring of standard size. It is doubtful whether sufficient time was given for the heat to penetrate evenly through so thick a layer of rubber, and it is probable that the outer layers were more fully vulcanized than the inner parts of the discs. It is stated that the conditions of vulcanization were similar to those technically used in the manufacture of inner tubes, but these later usually contain an appreciable proportion of antimony sulphide in addition to the sulphur which facilitates the conduction of heat through the mass, also of "accelerators" which are capable of reducing the time required for vulcanization from one-half to one-third of that otherwise required. It is stated that the physical qualities of the vulcanized rubber were satisfactory, but the tensile figures are not given and the fact that the rubber became soft and sank together during extraction points to very incomplete vulcanization. This does not happen with moderately under-vulcanized rubber. Harries and Fonrobert extracted a large quantity (500 grms.) with acetone for a long period (60 days).† At the end, the rubber contained only 0.29% of sulphur. It was assumed that, given sufficient time, this residue would eventually have been removed and therefore the sample may be said to contain no combined sulphur. Owing to the large amount of rubber taken for extraction and the defects of the extraction apparatus, it appeared probable that this result would be more quickly obtained by the extraction of small samples, rolled very thin, using a form of apparatus in which extraction takes place at the boiling point of acetone (Analyst, 1913, 38, 143).

I determined therefore to vulcanize a mixture of Para‡ rubber and 10% of sulphur under the same conditions as employed by Harries, that is for 30 minutes at 145° C., but in the form of a thin sheet ½—1 mm. thick so as to obtain uniform vulcanization. At the same time a second experiment was made with the same mixture of rubber and sulphur, vulcanizing for 19 minutes only. It is well known that Para rubber from different sources varies in rate of vulcanization. The experiments were therefore extended to include a sample of fast vulcanizing plantation Para rubber. Approximately one-quarter of each sample was removed after 1, 2, 4, and 9 weeks' extraction (1 week = approximately 50 hrs.), and the sulphur estimated with the following results :—

Para Rubber A Vulcanized in Steam at 145° C.

Period of extraction	Combined sulphur % (1) 30 min.	(2) 19 min.
1 week	1.54	0.94
2 weeks	1.54	0.96
4 weeks	1.47	0.95
9 weeks	1.55	0.96

Para Rubber B

(3) and (4) were vulcanized to correspond with (1) and (2) above. They were extracted for periods of 2 weeks and 9 weeks.

Period of extraction	Combined sulphur % (3) 30 min.	(4) 19 min.
2 weeks	1.11	0.67
9 weeks	1.08	0.70

Fast Vulcanizing Para Rubber C

This sample was treated similarly to B.

* From Journal of Society of Chemical Industry, July 15, 1919.

† Presumably the extraction was not carried on during the night as the apparatus was leaky. Sixty days may therefore be taken to represent about 500 hours.

‡ That is, derived from *Hevea braziliensis*.

Analyses were made in duplicate.

Period of extraction	Combined sulphur % (5) 30 min.	(6) 19 min.
2 weeks	2.69	1.40
	2.33	1.53
9 weeks	2.39	1.47
	2.33	1.46

The vulcanized specimens were subjected to physical tests. Ring-shaped test pieces gave the following results :—

Rubber sample	Time of vulcanising (minutes)	Breaking strain, grms. per sq. mm.	Final length (original length = 1)
(1) A	30	830	10.7
(2)	19	490	11.2
(3) B	30	750	11.1
(4)	19	290	12.2
(5) C	30	1300	10.8
(6)	19	890	11.2

With regard to these figures, the breaking strain of (5) is only a little below that normally given for a fully vulcanized Para rubber. This sample contains about 2.4% of combined sulphur whereas a fully vulcanized rubber usually contains 28—3% calculated on the rubber (coefficient of vulcanization.) The breaking strains of (1) and (3) are not much over one-half of what would be obtained if fully vulcanized. The final length (length at the moment of rupture) corresponds throughout with the breaking strain and tends to give a lower figure, the higher the breaking strain. It may be said that (1) and (3) are quite typical of a moderately under-vulcanized rubber. All vulcanized specimens, even those vulcanized for 19 minutes only, swell but do not dissolve in cold benzene.

These analytical results show clearly that, within the limit of accuracy of the sulphur estimations (the rubber being in the form of thin sheet), the whole of the so-called free sulphur is extracted in two weeks. A further seven weeks' extraction did not reduce the amount of combined sulphur. To judge from the figures for the rubber A, the extraction of free sulphur is complete in one week (say 50 hours), and for technical work a 5—10 hours' extraction is usually regarded as sufficient.

These results are in total disagreement with those obtained by Harries and Fonrobert. All three specimens of raw rubber contained over 1% of combined sulphur after 9 weeks' extraction when cured for 30 minutes at 145° C. (45 lb. steam pressure), whereas Harries and Fonrobert obtained only 0.29% under less favorable conditions for the extraction of the free sulphur. When vulcanized for only 19 minutes, the figures for the combined sulphur are more than double those obtained by Harries and Fonrobert. One can only conclude that these investigators were working with an excessively slow vulcanizing and inferior quality of rubber or that, owing to the thickness of the discs used and the short time of vulcanization, or for some other reason, the rubber was only surface vulcanized. It appears therefore that the technical effect of vulcanization has not been obtained without an appreciable amount of sulphur becoming insoluble in acetone, that is, presumably combined with the caoutchouc hydrocarbon.

Actions of Solvents on Vulcanized Rubber

Although the process of vulcanization is of enormous technical importance, it is not possible to formulate a definition of vulcanization which will enable a sharp distinction to be drawn between a vulcanized and an unvulcanized rubber. Technically, vulcanization produces a physically improved product, showing greater indifference to changes of temperature and greater tensile strength and elasticity. Of the ordinary soft vulcanized goods, 2—4% of the sulphur cannot be extracted with acetone—the so-called combined sulphur. By "under-vulcanizing," the amount is smaller and the product is softer and physically weaker, as already shown in Part I. If the vulcanization be carried to its limits, a hard resilient solid (vulcanite or hard rubber) is produced, and up to 32 or 33% of sulphur may remain undissolved after prolonged acetone extraction.

Solvents such as benzene and carbon bisulphide are frequently employed to differentiate between vulcanized and unvulcanized rubber (compare Harries, Ber., 1916, 49, 1196), on the assumption that vulcanized rubber is insoluble and unvulcanized rubber soluble, but tests with different solvents under different conditions showed that the "solubility" of vulcanized rubber in organic solvents is dependent on (1) the nature of the solvent, (2) the time of immersion in the solvent, (3) the temperature, (4) the degree of vulcanization, and (5) the age of the vulcanized specimen. I have already remarked on the progressive solubility in benzene of rubber "vulcanized" with benzoyl peroxide (*Journal of Society of Chem. Ind.*, 1917, 109), the rubber tending to insolubility in benzene with intensification of the vulcanizing conditions as, for instance, by increasing the proportion of benzoyl peroxide. Vulcanization with sulphur and with benzoyl peroxide is therefore analogous as regards the physical properties and solubility of the vulcanizate.

Raw Rubber

It is generally assumed that raw rubber is soluble in solvents such as benzene and carbon bisulphide, but in many cases the solubility is only partial after months of immersion in the solvent. It is necessary to distinguish between:

(*a*) Rubber obtained by evaporation or coagulation without mechanical working—at the most, a pressing of the clot to expel part of the mother liquor and facilitate drying. To this class belong the so-called plantation sheet rubber, "fine Para," and most wild sorts.

(*b*) Rubber which has been worked (crêped) after coagulation in the moist state or by subsequent working (mastication) of the dry rubber of the type described under (*a*). The working, whether crêping or mastication, is accomplished by passing the rubber through differentially geared rollers.

Rubber in category (*a*), when immersed in a solvent, swells considerably unless of low quality, *i.e.* degraded * rubber which is soft, adhesive, or even semifluid, owing to unsatisfactory treatment in preparation or preservation. Taking the case of plantation sheet or dry Para rubber, the rubber swells enormously and gradually passes into solution, the mass of rubber retaining its swollen skeleton form. After a long period and treatment with fresh solvent, the skeleton may collapse, leaving a slimy deposit rich in nitrogen. It is probable that the retention in shape and only gradual dissolution is caused by a network of protein films formed when the rubber is coagulated. This is particularly the case with rubber coagulated with tannin or products containing tannin which act on and toughen the protein films. The reticulated structure of these films is microscopically visible if thin pieces of the rubber are swollen in benzene with due care.

Rubber in category (*b*) readily dissolves in benzene; the amount of swelling depends on a variety of circumstances, including the degree of working to which it has been subjected.

Caspari (*Journal of Society of Chem. Ind.*, 1913, 1041) separated samples of rubber into a soluble and a "pectous" variety by prolonged extraction with petrol ether in the cold. I have repeated Caspari's experiments but was unable to obtain concordant results in repeat extractions. The proportion of soluble to "pectous" appeared to depend on the period of extraction. Moreover, I found that the "pectous fraction," if allowed to stand sufficiently long in cold petroleum spirit, dissolved wholly with the exception of a small quantity of slimy nitrogenous matter which settled to the bottom of the containing vessel, so that the behaviour of petroleum spirit as a solvent differed from that of benzene in degree and not in kind. Petroleum spirit is merely a less effective solvent than benzene.

Raw and vulcanized rubber exhibit varying behaviour when immersed in a solvent. This should be noted as indicating the degree of "solubility." The most readily soluble rubber dissolves with little or no swelling, almost like a crystalloid. A less easily soluble rubber swells before dissolving. As the

* The term "depolymerized" is usually employed but this presupposes a molecular change for which proof is wanting. I therefore prefer the term "degraded."

volume of the gel increases, more difficulty is experienced in producing a permanent emulsion with excess of solvent. Vigorous shaking is necessary and eventually one arrives at a stage when gelatinous flakes remain "undissolved." This marks the limit of "solubility." Beyond this stage, the more fully the rubber is vulcanized (*i.e.*, the higher the percentage of combined sulphur), the less the rubber swells in the solvent.

Vulcanized Rubber

No investigations have been published dealing with the solubility of vulcanized rubber in solvents such as benzene and carbon bisulphide. The general impression is that vulcanized rubber is insoluble in contrast to the solubility of raw rubber. In connection with the previous paper it was important to ascertain the lower limit of combined sulphur which would confer the property of insolubility in organic solvents. Preliminary experiments showed that the quantity of combined sulphur required to confer insolubility as above defined was very small, and it was therefore found impracticable to vulcanize at the previous temperature of 145° C. as the time of heating was too short and the temperature of the steam digester could not be raised sufficiently rapidly to enable accurate measurements to be made of the time of heating. Therefore a lower temperature was chosen. Specimens consisting of 90 parts of raw rubber and 10 parts of sulphur were vulcanized for 30, 40, 50, and 60 minutes at 125° C., at which temperature the rate of vulcanization was reduced to about one-seventh of that at 145° C.

The following figures were obtained after exhaustive extraction of the vulcanized specimens with acetone at the boiling point :—

Minutes vulcanized at 125°C.	Sulphur %
(1) 30	0.27
(2) 40	0.39
(3) 50	0.45
(4) 60	0.54

These figures show that the percentage of combined sulphur is approximately proportional to the time of heating, as in the case of more fully vulcanized rubber.

After standing 24 hours, small pieces of the vulcanizates were allowed to swell in benzene overnight. On shaking, (1) dissolved readily, giving an apparently homogeneous solution; (2) appeared to be only partly dissolved and the solution was ropy; (3) gave a swollen mass which was broken up on shaking, gelatinous lumps remaining visible; (4) was unaffected by shaking, the swollen mass remaining unbroken. We have therefore the transition states between solubility and insolubility of the vulcanizate in benzene and, according to Harries, (1) might be taken as the unvulcanized or metastable form, while (4) certainly represents the stable or vulcanized form. On this basis about ½% of combined sulphur is sufficient to confer the property of insolubility in benzene.

Portions of the four vulcanized samples were kept for 3 months at winter temperature and other portions for the same period in an incubator at 30° C. On examining the specimens for solubility in benzene, those specimens preserved at winter temperatures were somewhat less soluble, the specimen (2) now behaving similarly to specimen (3) when originally tested. Those specimens kept at 30° C. were more altered, being still less soluble; thus (1) could no longer be dissolved in benzene on standing overnight and shaking. It was found, however, that all specimens dissolved to a large extent in benzene when left long enough immersed in the solvent.

It is generally agreed that it is exceedingly difficult to remove the last traces of free sulphur from an unvulcanized mixture of rubber and sulphur. Thus the following figures were obtained on the analysis of an unvulcanized mixture of 90 parts of rubber and 10 parts of sulphur before and after extraction for one week :—Before extraction, 9.84% S. After extraction, 0.13 and 0.12% S.

The unvulcanized mixture dissolved more readily in benzene than sample (1) above. A difference could be detected in the physical properties so that it may be said that sample (1) showed the effect of vulcanization to a slight degree.

Although benzene has but little solvent action on fully vulcanized rubber in the cold, I find that, by prolonged extraction of the acetone-extracted rubber in a Soxhlet at the boiling point, a considerable proportion may be dissolved. The extracted rubber tends to solidify on the sides of the flask in which the solvent is boiled, but part remains in solution. On evaporation of the benzene, the rubber remaining no longer dissolves appreciably when fresh benzene is added and set aside in the cold or the liquor boiled.* In this respect the solution of vulcanized rubber obtained resembles that produced by the action of ultra-violet rays on a solution of raw rubber and sulphur in benzene (Helbronner and Bernstein, Comptes rend., 1914, 158, 1343). The recovered rubber is of inferior physical properties. The following experiments were made to ascertain whether it was possible to separate vulcanized rubber into parts containing different proportions of "combined" sulphur.

Result of Solvent Action of Benzene

Two samples of vulcanized rubber, A and B, were extracted with acetone at the boiling point for one week and the combined sulphur estimated. Parts of the extracted rubbers were dried, weighed, and similarly exhaustively extracted with benzene at the boiling point for one week. The extracted rubber was dried and weighed, and the sulphur estimated in the residue.

Benzene extract : (A) 30.8% ; (B) 13.7%. Sulphur content of residue before benzene extraction: (A) 3.80, 3.80%; † (B) 8.64, 8.77%. Sulphur content of residue after benzene extraction : (A) 3.85, 3.86%; (B) 8.35%.

It will be seen that, although an appreciable proportion of the vulcanized rubber was dissolved by the benzene, the residue of A contains the same percentage of sulphur as the original acetone-extracted rubber, and the residue of B almost as much.

The benzene extractions were now repeated with portions of the acetone-extracted rubbers, A and B, which had been put aside for 2—3 weeks in the dark. The benzene extracts were (A) 53.3%; (B) 53.1%.

That is to say, the benzene soluble had increased to over 50% in the course of ageing. I have already drawn attention (8th Internat. Cong. Appl. Chem., 1910, 25, 585; Koll. Zeits, 1914, 14, 96) to the rapid deterioration that rubber undergoes after it has been extracted with acetone, particularly when vulcanized. Such "perished" or "resinified" rubber is readily soluble in benzene. In the above cases the extract had the physical properties of a rubber rather than of a resin, although it underwent a further change on keeping, becoming brittle and "resinous." It was also found that, on keeping the above-mentioned acetone-extracted rubber for 5—6 weeks, it dissolved completely in benzene with the exception of a small amount of a flocculent precipitate, probably due to the protein constituent of the original rubber. The benzene solution when evaporated gave a varnish-like film, moderately hard but inelastic. Portions of the extracted rubber and the extracts of A and B were analyzed.

The extracted rubber contained (A) 3.57, 3.59%. (B) 8.57, 8.38% S. and the benzene extracts (A) 3.34, 3.36%, (B) 8.09, 8.22% S. In both cases the extract contained slightly less sulphur than the extracted rubber. There was also an apparent loss of sulphur during the ageing of the acetone-extracted rubber. Some weeks later a portion of the acetone-extracted rubber, A, now aged and perished, was found to contain 3.32 and 3.33% S. These figures compare with 3.80% originally present in the acetone-extracted rubber, A.

As the foregoing results show that the solubility in benzene of an acetone-extracted vulcanized rubber depends on the period that has elapsed since the rubber was subjected to extraction with acetone, it was desirable to ascertain in what

* The rubber sometimes dissolves when covered with benzene and set aside for two or three months.

† Here and subsequently duplicate figures give the results of duplicate analyses.

degree a sample freshly extracted with acetone dissolved in benzene.

A freshly vulcanized sample of rubber, C, was extracted with acetone for one week and immediately extracted with benzene for a like period. It yielded 10.9% of benzene extract. The original acetone-extracted rubber contained 3.80, 3.70% of sulphur, and the benzene extract 3.68%.

The residue was then immediately re-extracted with acetone and gave a small extract amounting to 1.7% containing 3.77, 3.82% S. It appears that the process of benzene extraction, or the removal of the benzene preparatory to extraction with acetone, has produced some degradation of the rubber, as it now yields 1.7% to acetone although previously exhaustively extracted with acetone. There is no appreciable variation in the sulphur content.

A portion of the original rubber, C, was also extracted with benzene without previous acetone extraction. The extract consisted almost entirely of sulphur. The residue contained 3.90, 3.97% S.

These figures are a trifle higher than for the acetone-extracted rubber. The fact that very little rubber was extracted by the benzene seems to indicate that vulcanized rubber with this proportion of "combined" sulphur is almost insoluble in benzene and only dissolves when degraded or oxidized, and that such degradation takes place rapidly when exposed to air after acetone extraction or during the acetone-extraction process itself.

The stability of a vulcanized rubber varies with the sulphur content of the acetone-extracted rubber, that is, the "combined" sulphur. I have shown by physical tests (this Journal, 1916, 872; 1918, 305 t and 340t) that a vulcanized rubber of this type is fairly stable over a period of 2—3 years under ordinary atmospheric conditions when the coefficient* does not exceed 3. With higher coefficients, such as 6 or 7, decomposition sets in quickly, so that the rubber is brittle or "perished" in a few weeks. It was therefore of interest to compare the behaviour to benzene of vulcanized rubber both with relatively low and high coefficients. A has a relatively low coefficient (about 4.3). To compare with A, a rubber, D, was taken which after one week's extraction with acetone gave 9.36, 9.42% S. It was placed in a desiccator for 26 days and the sulphur redetermined. S = 7.41, 7.63%. That is to say, an apparent loss of nearly 20% of sulphur in 21 days. This compares with an apparent loss of approximately 12% in several weeks for sample A.

A great part of this apparent loss is explained by an increase in weight which was found to take place while the rubber was ageing.† To obtain uniform results, ageing was carried out in an incubator at 30° C. A vulcanized rubber, E, was extracted with (1) alcohol one week and acetone one week, (2) as (1) followed by benzene extraction for one week, and (3) benzene extraction only for one week. The extracted samples were dried at a low temperature for a few hours and analyzed without delay. (1) 4.05, 3.95, (2) 4.10, 3.80; (3) 3.90, 3.97% S. These figures show that the vulcanized rubber was in all cases exhaustively extracted and contained no sulphur soluble in organic solvents. The extracts consisted almost entirely of sulphur.

Portions of (1) and (2) were weighed after extraction and placed in the incubator at 30° C. They showed the following increases in weight :—

Days ageing	(1) %	(2) %
25	14.7	14.0
40	19.2	18.7

At this stage the specimens contained (1) 3.49%, (2) 3.38% of sulphur.

Assuming the apparent loss of sulphur to be due entirely to the increase in weight, the calculated figures would be (1) 3.35 and (2) 3.37%. During ageing, vulcanized rubber emits a peculiar odor and gives off acid vapors due to a trace of a volatile product containing sulphur. When passed into water, the substance is retained and the solution reduces ammoniacal silver nitrate. A trace of sulphur is therefore lost in a volatile form.

Conclusions

(1) No sharp distinction can be drawn between the "solubility" and "insolubility" of vulcanized rubber in organic solvents.

(2) The more fully the rubber is vulcanized, that is, the higher the percentage of "combined" sulphur, the less is the tendency to dissolve.

(3) Fully vulcanized rubber, such as that containing 3—4% of "combined" sulphur, is almost insoluble in benzene.

(4) Vulcanized rubber rapidly oxidizes after extraction with alcohol or acetone, and becomes soluble to an increasing extent in benzene. "Over-cured" rubber with 9—10% of combined sulphur oxidizes more rapidly than rubber with 3—4% of combined sulphur.

(5) Vulcanized rubber recovered from the solution in benzene becomes almost completely insoluble in benzene, provided the original rubber was not oxidized (perished). This recovered rubber possesses the nature and general physical properties of vulcanized rubber.

(6) Vulcanized rubber dissolves more readily in benzene the more it is oxidized. At the same time the recovered rubber becomes more inelastic or "resinous" and dissolves more readily in benzene.

(7) The increase in weight due to the oxidation of acetone-extracted vulcanized rubber fully accounts for the apparent loss of sulphur which takes place. But a trace of sulphur is lost in the form of a volatile product of an acid and reducing nature and containing sulphur.

(8) Extraction with benzene does not allow of the separation of a vulcanized rubber into parts vulcanized to different degrees (having different coefficients).

Oil From Rubber Seed

The Weekly Bulletin of the Trade and Commerce Department at Ottawa has the following to say in regard to the commercial use of rubber seed for oil cattle food, rubber substitutes, etc.:

There has been considerable discussion during the past year or two concerning the utilization of Para rubber seed for oil, and it is stated that already exhaustive experiments have been made along this line. It is cited that in one instance oil from rubber seed was sold at about $250 a ton at a time when the price for linseed oil stood at $300. Experts are of the opinion that this oil could probably be successfully used in the manufacture of paints and varnishes, linoleums, soft soap, rubber substitutes, etc.

In addition to the use of rubber seed for the purposes above mentioned, it is stated that experiments conducted in this country have clearly shown that a feeding cake for cattle and other stock, favorably comparing with linseed and other oil cake, can be produced from the residue of the Para rubber seed, after the oil is extracted, thus affording an opportunity for the development of a profitable industry in connection with oil extraction.

In British Malaya alone it is said that there were last year nearly 2,000,000 acres in possession of rubber estates. Of this area over 1,000,000 acres were planted and no less than 633,000 acres were producing rubber. The quantity of seeds thrown off each year by the tree is estimated at over 300 pounds to the acre. The seeds fall to the ground and are left to rot, and what might be turned into a rich and important industry is neglected.

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* The coefficient is the percentage of combined sulphur calculated on the raw rubber present in the vulcanized rubber.

† In a similar manner a rubber not acetone-extracted but vulcanized to give a relatively high coefficient (say over 4) shows a loss of combined sulphur on ageing owing to an increase in the weight of the rubber due to oxidation which accompanies "perishing." Previous acetone extraction of the rubber increases the tendency to oxidation and "perishing" and consequently thne apparent loss of combined sulphur is more marked.

Growing of Domestic Egyptian Cotton

Egyptian cotton largely used in the American tire industry, and formerly entirely imported, is now being grown on an extensive scale in this country, and the rapid development of the industry in southwest will in time make the United States independent of the Egyptian market, and will leave the United States sole and undisputed leader among the cotton-growing nations of the world. The growing of this long staple cotton, begun as an experiment several years ago, has now passed beyond the experimental stage and domestic growers are now supplying a good part of the demand for this product in the United States.

With the United States occupying the leading position in the raising of cotton, this country was formerly obliged to rely almost entirely upon Egypt for the huge amounts of long staple used in this country. The consumption of this cotton has rapidly increased during the past decade, and in 1913, imports totaled well over 300,000 bales of Egyptian cotton. This cotton is used in a small way for mercerizing fabric so as to resemble silk, but is mainly used in the manufacture of thread and fabrics needing unusual strength. The chief use of the Egyptian staple today is in the manufacture of cotton duck and cord used in making automobile tires and fire and other rubber hose.

Sea Island cotton was formerly largely used in these industries, but its use has fallen off considerable due to several factors. While the Sea Island cotton has a stronger staple than the Egyptian variety, it does not stand vulcanizing as well, and with the production of Sea Island rapidly dwindling, tire manufacturers are abandoning its use, and substituting the Egyptian staple, which not only has the required strength and is peculiarly adapted to vulcanizing, but is also obtainable in the quantities needed.

Experiments by Bureau of Plant Industry

As a result of the rapidly-increasing consumption of Egyptian long staple cotton by American manufacturers, the Department of Agriculture, through its Bureau of Plant Industry, began experiments with Egyptian cotton in the Colorado River region, where the very long and hot summer, sometimes almost rainless, deep soil, and irrigated agriculture, closely approximate the conditions in Egypt. As the result of these experiments a number of small "ranchers" began the growing of an American variety of Egyptian cotton, developed by the Department of Agriculture. This American variety of Egyptian cotton produces a staple of from 1¼ to 1¾ inches.

In Arizona, a variety known as Pima cotton has been successfully developed, the fibre of this cotton being superior even to the best imported Egyptian cotton, according to the opinions expressed by many manufacturers using this cotton. The yield of this Pima cotton is well over a bale to the acre, and the fibre averages 2 inches. This compares to a yield of 450 pounds per acre in Egypt, where the staple averages 1¼ to 1¾ inches. In the Sea Island belt, the production is low, averaging only about 125 pounds to the acre, although the staple is longer than the Egyptian, averaging 1½ to 2 inches. The growing of this Sea Island cotton has been rendered unprofitable during the past few years, however, as the result of the invasion of the boll weevil pest and the inroads made by the army worm and other insect pests. As a result of this, production has been curtailed by about 90 per cent.

With a heavy demand coming in from the United States, the British Government a few years ago set about to increase production of Egyptian cotton. No land can be cultivated in Egypt unless it receives irrigation water from the Nile, and the British Government spent millions of pounds in establishing the Assouan Dam, to increase the available acreage in Egypt. The present production in Egypt is acknowledged as the maximum that may be expected from that country, and the American users of the cotton have consequently been forced to turn to the development of an American variety, as consuming demand is constantly on the increase.

In 1916, the domestic grown Eygptian cotton sold to users on the basis of 58 cents per pound, and the next year this price rose to 75 and 80 cents per pound, stimulated by war-time conditions. In 1916, the Goodyear Tire and Rubber Co. purchased and leased a total of about thirty thousand acres of land in Arizona, and began its development through a subsidiary company, known as the Southwest Cotton Co. Operation were started on December 26, 1916, and a total of 6,000 acres had been cleared, leveled, ditched, and put in seed before the first of May in 1917. About 5,000 acres of this land receives irrigation from the Roosevelt Irrigation Project, and on the remainder of the land irrigation is accomplished by the plan of sinking wells and thus obtaining a supply of underground water. All this 30,000 acres of the Southwest Company was planted to seed of the Pima cotton which had been developed in the immediate vicinity under similar growing conditions.

During the later part of 1917, it was reported that Boston bankers had extended aid to the growers in the marketing of their product. A number of large companies were also formed about this time, developing large tracts of land, and in the irrigated district of Arizona and California the smaller planters have taken up the cultivation of Egyptian cotton on a large scale.

Large Acreage Still Available

The cost of growing Egyptian cotton in Arizona, under present conditions, has averaged from $80 to $100 per bale, or from 16 to 20 cents per pound, exclusive of rent. The price of this cotton averaged 75 cents per pound last year, which returned growers a good profit. In addition, each bale of cotton produces 1,300 pounds of seed, which yields the growers an additional return of from $26 to $32.50 per acre. In 1917, there were 33,000 acres planted in Arizona, and by the year following, this acreage had grown to 85,000 acres. There is land enough in the Southwest, suited to the growing of Egyptian cotton, to grow long staple cotton to take care of the American demand, which experts figure will expand to 1,000,000 bales per year ultimately. The choicest of this land is in the district known as the Yuma Reclamation Project, situated between the Mexican border and Yuma, Arizona.

Commenting on the rapid growth of the industry in the Southwest, Mr. George Frederick Stratton, in a recent issue of the "Country Gentleman," says: "A cotton grower from Texas leased 100 acres of land in the Salt River Valley at $30 an acre, with option of buying at $200 per acre. When his first cotton crop was ready to pick, the landowner sauntered in and offered to give a receipt for the full year's rental and a clear title to the land for that crop. A Georgia man bought 160 acres at $150 an acre in the spring of 1917, planted it to cotton, and cleared the $24,000 he had paid for the land, all operating expenses, and banked $12,000,—the return from this crop.

"A homesteader whose total assets were a wife and family, a shack, two horses, and a cow, sold the cow to obtain cash to buy cotton seed for 40 acres. Just after it was planted, he got a sudden call over the Great Divide and his widow and children worked that crop and picked it. Although she had never seen a cotton plant before, she displayed great ability and willingness in following the instructions of the agricultural experts and she secured forty-one bales from the 40 acres, which was bought by a motor-tire company at seventy-eight cents per pound, totaling $16,000. The cash invested was the $55 from the sale of the cow."

Cotton experts generally agree that at the lowest estimate Arizona cotton is worth at all conditions of the market from two to two and one-half times the value of short, or Upland cotton.

Akron Stock Market Is Active

(Special Akron Correspondence)

Attention of Akron investors at present is centered on Goodyear and Goodrich common stocks. Increase in price of the first has been sensational, even on a rising market. The latter has shown some rapid advances.

Goodyear after advancing three or four points daily for a week, climaxed its rise on Sept. 13 by jumping 14 points during a half-day session. It opened at 371¼ on a 50-share sale and closed at 385.

From sources considered authoritative it is learned that investors expect something in the way of a stock dividend in case the United States Supreme Court decides that such dividends are not subject to income tax provisions. If this were all the wise men of the market had to go on they would be taking a long chance, but it is said that the sustaining power of the stock is a belief that should the court decision be adverse, the Goodyear will issue shares of no par value on somewhat the same plan as the Firestone distribution of a few years ago. The expectation is that if more shares are issued the dividend rate will be maintained as it is now, which would prove a very attractive proposition for shareholders.

Within the last two weeks Goodrich has advanced from 70 to a little over 80 in response to the general movement on the New York Exchange.

The *Wall Street Journal* predicts an increase in dividend for Goodrich, while the *Financial World* is of the opinion that Goodrich may go on the same basis as United States Rubber, which is 8 per cent.

Goodrich earnings for 1918, before taxes, were equal to $23.08 a share on the common stock while this year's earnings are expected to set a new record. In this connection, the *Wall Street Journal* says:

"Directors of the Goodrich company have been extremely conservative in the matter of dividends, keeping the stock on a $4 annual basis despite the fact that earnings year after year have run at over three times the disbursements. The company has $15,000,000 of notes maturing this fall and after these have been taken care of there is every reason for believing that common shareholders will receive an increase in dividends. At the end of last year the profit and loss surplus account was in excess of $30,000,000 as against slightly over $10,000,000 at the end of 1913."

Goodrich Stock on the Market

Less than half of the B. F. Goodrich Company 7 per cent cumulative sinking fund preferred stock of $15,000,000 has been put on the market through a number of concerns in New York and Cleveland. Eight million of the $15,000,000 has already been sold to stockholders of the company under their rights to subscribe and the balance is now offered at 104½ yielding about 6.70 per cent.

The announcement of the offer contains the following statistics:

This additional preferred stock is issued to provide for the retirement of $15,000,000 of two-year 6 per cent notes outstanding, making this amount permanently a part of the working capital.

After elimination of good-will, the company's balance sheet for Dec. 31, 1918, corrected to show the effect of the present financing, shows net tangible assets equal to over $205 per share of preferred stock outstanding, and net quick assets equal to about $149 per share.

Net working capital increased over 270 per cent from 1913 to 1918. After giving effect to the present financing, net working capital will be over $58,900,000.

Earnings for the past six years (1918 earnings figured without deduction for federal taxes) have averaged more than three and one-third times the dividend requirement on the preferred stock; 1918 earnings before federal taxes were over 5.6 times the dividend requirements. Results for the first half of 1919, so far as can be calculated, indicate earnings for the year will exceed those for 1918.

Sinking fund provisions require the retirement by purchase or redemption annually at not exceeding 125 and accrued dividends of 3 per cent of the largest amount of preferred stock which shall at any time have been outstanding. Under this provision, from July 1, 1914, to July 1, 1919, $5,400,000 of the prefered stock has been retired.

Preferred both as to assets and earnings. No mortgage may be placed on properties nor preferred stock be increased without consent of three-quarters of both the outstanding preferred and common stock. In case of default of four quarterly dividends the preferred stock shall have equal voting power with the common.

The market value of the common stock junior to this issue of preferred stock, as of Sept. 2, 1919, at the close of the market, was over $45,000,000.

Akron Rubber Stock Prices

(Special Akron Correspondence)

Quotations on the Akron market for rubber shares on Sept. 13 were:

	Bid.	Asked.
American Rub. & Tire	59	...
do pfd.	105	...
Amazon Rubber	...	140
Firestone	174	176
do pfd.	100	101
General Tire	480	...
do pfd.	98	100
B. F. Goodrich	81	83
do pfd.	104	104¾
Goodyear	383	387
do 1st pfd.	107	107½
do 2nd pfd.	107½	108½
India Rubber	200	215
Kelly-Springfield	135½	137½
Mason Tire	24½	...
do pfd.	...	87
Marathon com.	...	85
Miller Rubber	190	200
do 1st pfd.	103	104
do 2nd pfd.	104	105
do com. rights	17	17½
Mohawk Tire	303	...
do pfd.	100	110
Portage Rubber	142	146
do pfd.	98	99
Republic Rubber	6½	6¾
do 1st pfd.	...	96
do 2nd pfd.	...	92
Rubber Products	141½	...
Star Rubber	350	...
do pfd.	97	98½
Swinehart	85	90
do pfd.	91	94

Large Stock Fee

(Special Akron Correspondence)

When the Firestone Tire & Rubber Co. took out the papers necessary to increase its capital stock from $13,500,000 at Columbus a few days ago, one of the largest fees ever paid the state of Ohio was turned into the Buckeye treasury.

The fee amounted to $61,505.

Plans for the increase here have been completed and the stock sales will probably be under way soon. For the present, only preferred stock will be disposed of, but it is possible that later employes will again be given an opportunity to buy some of the common stock.

Osterlch Is Goodyear Los Angeles Manager

A. E. Osterich, secretary of the Goodyear Tire & Rubber Co., has been selected vice-president and general manager of the new Goodyear Co. of California. Mr. Osterich will leave Akron Oct. 1 to take over his new duties in the West.

To the active management of this great business and the work of carrying on its expansion, Goodyear brings a man who has been intimately identified with the company since four years after its organization, when it was a small and struggling concern. Mr. Osterich, now one of the best known men in the rubber industry, is one of those who have helped to bring Goodyear to its present position as one of the greatest of America's industrial giants.

Starting out as a salesman in Chicago territory, Mr. Osterich was subsequently made branch manager and then manager of the western sales division for Goodyear. He was then brought to Akron as assistant secretary of the company, and, in 1915, became secretary. While salesmanship had been his forte, since becoming an officer of the company, he has given his attention to all the other activities of Goodyear, and his ideas have been prominent in the formation of the policies that have been responsible for the wonderful success of the company, and his selection for this great responsibility of the coast is a fitting recognition of his past achievements and follows as a natural development in the growth of the Goodyear.

It is probable that other Goodyear men from Akron will be affiliated with the California plant, upon its opening about May 1, 1920. As far as possible, however, the local plant will be kept intact, and many of those sent west will go only temporarily.

As previously stated in interviews from F. A. Seiberling, president of the company, the California plant will in no way interfere with the local company, Akron's plant will be operated at full capacity and as many more men will be employed from time to time as can be handled under the present transportation and housing conditions.

The Goodyear project in California contemplates an adjunct to the immense plants of Akron which have grown by leaps and bounds during the last decade which will provide an increased production to meet the demands for the Goodyear products.

The California company has a capitalization of $20,000,000; will employ something like 7,000 workers at the start; and will have a capacity of 7,500 tires per day. There will be cotton mills operated by a subsidiary company, the Pacific Cotton Mills Co., with 33,000 spindles and a capacity of 75,000 pounds of cord fabric and 75,000 pounds of woven fabric each week, with 1,200 employes.

The ultimate plans of Goodyear contemplate for the California plants an expansion of both industries to four times the original capacity.

Upson in Balloon Race

(Special Akron Correspondence)

Ralph H. Upson, pilot of the Goodyear balloon that won the international race from Paris before the war, will have charge of the new balloon Goodyear is to enter in the St. Louis race next month. The new air-bag is patterned after the first Goodyear title winner, but is larger and has all the improvements made in free balloons during the experiments conducted during the war.

Wildman Resigns as President of Portage

W. W. Wildman Resigns as President and General Manager of Portage Rubber Company—Remains as Director—Was with Portage Since 1910 —Company was Incorporated and Organized by Mr. Wildman

Announcement is made of the resignation of W. W. Wildman as president and general manager of the Portage Rubber Co., Barberton, Ohio. Mr. Wildman still remains a director and does not contemplate disposing of his interest in the company.

Mr. Wildman is well known in the rubber industry and it is greatly due to his energy and ambition that the Portage Rubber Company has been a success. The United Rubber Works was also started by Mr. Wildman.

Mr. Wildman was born in Zanesville in 1872. His father, John B. Wildman, came to this country from Ireland when he was only a few years old and moved to Zanesville after residing in New York City for a short period. Later he moved to Chicago.

The Wildman family is prominent in the history of the Portage Rubber Co. and to this day has a direct interest in the business. Mr. Wildman's sister, May W., is the wife of L. E. Larson, secretary of the company. A brother, Banks J. Wildman, was made president and treasurer of the Portage Rubber Co. of California. Two other brothers, Joseph W. and Theodore Thomas, are, respectively, manager of the Chicago branch and sales manager of the company.

After completing his high school education Mr. Wildman became connected with his father's store and later was admitted to membership in the firm. Following this he worked for Marshall Field & Co., the National Tube Works and James B. Clowe & Sons, all of Chicago.

In 1906 Mr. Wildman entered the rubber field and was made assistant superintendent of the mechanical goods department in the Chicago plant of Morgan & Wright Co. He later became their mechanical goods sales manager. When Morgan & Wright changed hands Mr. Wildman identified himself with the Milwaukee Rubber Works, which was later taken over by the Federal Rubber Co. Here he was general manager and superintendent.

However, it was not until early in 1909 that Mr. Wildman, by this time assured of the future of the rubber industry, went to Akron. While there he developed and patented a process for the reclaiming of rubber and organized the United Rubber Co., of which he was treasurer and general manager. From the start this company has been a success, and it has been due in great part to Mr. Wildman's efforts.

When Mr. Wildman engaged in the rubber reclaiming business it was with the idea that a separate company would later be formed to manufacture finished rubber goods. Thus he brought about the organization and incorporation, in 1910, of the Portage Rubber Co. He was general manager from the start and was later chosen vice-president.

The first automobile tire was manufactured by it in October, 1911, and since that time the business has expanded very rapidly, so that now Portage fame is world wide. From time to time large additions have been made to the plant to accommodate the growth.

Mr. Wildman is a member of the Akron and Barberton Chambers of Commerce and the Akron City Club. He married Miss Della Thompson of Dayton, Ohio, and has one child, William Thompson.

W. W. WILDMAN

Foreign Trade to Be Discussed

An index of the importance which the business interests of the country attach to recent developments in international affairs is disclosed in the call which has been sent out for a convention of business men from every section of the United States to be held in New York next month.

While the foreign trade of the United States reached the unprecedented total of over seven billion dollars for the year ending June 30th, the figures for July show a falling off of nearly $350,000,000, and this fact coupled with the uncertainty of social and political conditions in Europe, and the serious and continuing depreciation of foreign exchange, has increased the demand of manufacturers and exporters, for information as to the best means of meeting the unusual situation in which business now finds itself.

At this convention, which will be held on October 16th and 17th under the auspices of the American Manufacturers' Export Association, business men of the country will be asked to determine and unite upon a definite plan of action with regard to trade with other countries.

Particular attention will be given to the question of trade with the new nations set up in the peace treaty and with Russia and the Central Powers. To this end special committees have already been appointed and will report their findings to the convention, which will also hear from official and commercial representatives, who have been asked to give their views.

It has been ascertained that many manufacturers have already found the rate of European exchange operating in the manner of an embargo against their products. The fact that European buyers must pay from fifteen per cent to six hundred per cent more for American dollars than they did before the war prohibits every purchase that is not essential. A joint committee of bankers and manufacturers has this matter under advisement at the present moment, and at the convention an effort will be made to formulate some general plan of financing European sales which will be helpful to the foreign buyer who needs the things which America can supply, and satisfactory to the American manufacturer who must have European markets to keep his factory running to full production.

The Edge bill which recently passed the Senate offers the machinery for some such plan, and this convention will tend to show how far our manufacturers are prepared to go in utilizing and supporting the machinery thus provideed.

The widespread interest which is being taken in this effort to crystallize the views of business on foreign trade problems is regarded as a sign that American manufacturers and shippers, who have only recently entered the export field, are determined to make this international trade a permanent part of their business. Factories which increased production during the war to meet abnormal demands are continuing to maintain their enlarged output because of orders from overseas. Not a few of the manufacturers who are operating on this basis declare that any great decline in the volume of the nation's foreign business is certain to bring depression and unemployment in its wake.

In order to make the convention as representative as possible, invitations have been sent to practically every recognized exporter in the United States, and in addition every Chamber of Commerce, Trade Association and Foreign Banking Institution has been requested to appoint delegates.

Among the many notable business men interested in calling the meeting are a number of men prominent in the rubber industry. They are F. A. Seiberling, President of the Goodyear Tire and Rubber Company; Robert A. Shaw, of the National Aniline and Chemical Co., Inc., and F. H. Taylor, of the S. S. White Dental Mfg. Company.

Goodyear Tire Book Is Free

In our August 25 issue mention was made of the book entitled "The Story of the Tire," issued by the Goodyear Tire and Rubber Company. A statement should have been made at that time that the purpose of the book was purely educational and could be obtained free for the asking from Goodyear. We are glad to make this correction and hope that all interested may avail themselves of the opportunity of obtaining the book.

Portage Quarterly Dividend

L. E. Larson, secretary-treasurer of the Portage Rubber Co., has announced a quarterly dividend of one and three-quarters per cent on all outstanding preferred stock of record Sept. 20. The dividend is to be paid Oct. 1.

U. S. to Build in Hartford

The United States Rubber Company is planning the erection of a six-story factory, 100 x 300 feet, on Bartholomew street, Hartford, Conn.

Motor and Accessory Manufacturers' Association Meeting in Buffalo

Interesting Meeting Held in Buffalo Brings Forth Numerous Talks by Leaders in Industry on Credit and General Business Subjects—Tire Industry Is Well Represented

Sane optimism was the predominate keynote of the third annual credit convention of the Motor and Accessory Manufacturers' Association, which closed its business sessions at the Hotel Lafayette, Buffalo, N. Y., Friday afternoon, September 12.

This attitude was almost unanimously reflected by the attendance of approximately 150 representative executives of the industry, including credit managers and general officers of leading automotive equipment companies throughout the country.

"We are looking at business conditions with unblurred, far-seeing glasses, rather than with rose-tinted spectacles," said Charles E. Thompson, President of the Association, who was Chairman of the Convention. Mr. Thompson is President of the Steel Products Company and the Glenn L. Martin Company, both of Cleveland, Ohio.

Although the two-day business sessions were devoted primarily to credit subjects, general conditions in the business world and particularly the automotive industry, were discussed from all angles.

"This was, without question, the most successful convention ever held by our Association, and one of the most important business get-together meetings of national scope in the recent history of the automobile industry," said Mr. Thompson.

On behalf of the City of Buffalo, Honorable Frederick G. Bagley, Commissioner of Public Affairs, welcomed the motor and accessory manufacturers at the opening session Thursday morning. He outlined the importance of Buffalo as an automobile center, and discussed the plans by which Buffalo was co-operating with the industry as a whole, and with the individual car owners, in the matter of parking regulations, municipally inspected garages, and other features making for more universal use of motor vehicles.

The broad and far-reaching usefulness of the Motor and Accessory Manufacturers' Association's Credit Department was discussed in great detail by R. E. Hayslett, Treasurer of the Hydraulic Pressed Steel Company, Cleveland; I. K. Schnaitter, Assistant Secretary-Treasurer of the Willard Storage Battery Company; H. A. Tongue, Credit Manager Firestone Tire & Rubber Company, and other speakers.

Important plans for the further enlargement and expansion of the credit service of the Association were outlined by C. A. Burrell, Manager of the Association's Credit Department. In the informal discussion that followed most of the addresses, many of the members present exchanged their viewpoints and ideas on the general usefulness of the Association in co-operative work, as well as on its specific service to the membership in matters affecting credit, railroad transportation, legislation, the administration of the excise tax, and the broad field of other activities vital to the industry.

The proposed Standing Creditors' Committee of the Association was outlined by E. R. Ailes, Treasurer of the Detroit Steel Products Company. This proposed Committee involves an important and extremely valuable extension of the Association's activities, and provoked considerable discussion. Sidney S. Meyers, General Counsel of the Association, delivered an authoritative and unusually illuminating address on the subject, "Advantages of Co-operation in Relation to Insolvent Debtors, and Constructive Plans in Cases Calling for Reorganization of Corporations."

The viewpoint of the National Association of Credit Men, with respect to the proposed Standing Creditors' Committee of the Association, was stated by E. B. Moran, Manager of the Credit Interchange Bureau of the National Association of Credit Men. The referee's viewpoint was expressed by C. D. Friebolin, Referee in Bankruptcy of Cleveland, the bankers' viewpoint by Joseph A. Bower, Vice-President of the Liberty National Bank of New York, and the members' viewpoint by J. M. McComb, Assistant Treasurer of the Crucible Steel Company of America.

Other important phases of the credit work of the Association were discussed by F. R. Wilhelmy, Assistant Treasurer of the Standard Parts Company, Cleveland, and M. C. Dittmann, Vice-President and General Manager of the American Bronze Corporation of Berwyn, Pa.

M. L. Heminway, General Manager of the Association, and C. A. Burrell, Manager of the Credit Department, expressed keen gratification over the success of the Convention. An informal banquet was held Thursday evening, and Saturday was devoted to a golf tournament and a trip to Niagara Falls.

Among those present who represented the rubber and tire industry were the following:

N. S. Conover, Empire Rubber & Tire Co., Trenton, N. J.

H. A. Tongue, Firestone Tire & Rubber Company, Akron, Ohio.

W. O. Rutherford, Vice-President The B. F. Goodrich Co., Akron, Ohio.

W. D. Skinner, The Republic Rubber Company, Youngstown, Ohio.

C. C. Marston, The Double Fabric Tire Co., Auburn, Ind.

E. S. Sargeant, The B. F. Goodrich Company, Akron, Ohio.

C. B. Reynolds, The B. F. Goodrich Company, Akron, Ohio.

V. I. Montenyohl, The B. F. Goodrich Company, Akron, Ohio.

W. I. Fornof, The B. F. Goodrich Company, Akron, Ohio.

J. M. Tait, The Federal Rubber Company, Cudahy, Wis.

J. A. Lyons, Kelly-Springfield Tire Company, New York City.

Charles H. Shaw, Sewell Cushion Wheel Company, Detroit, Mich.

W. B. Keiser, The Fisk Rubber Company, Chicopee Falls, Mass.

Meeting of Scrap Rubber Dealers

The Scrap Rubber Division of the National Association of Waste Material Dealers met at its quarterly meeting at the Hotel Astor, New York, at 10 A. M. September 16. Matters which have come up since the last quarterly meeting in June were discussed and in addition the matter of higher wages was given consideration.

A. A. C. W. Convention at New Orleans

The Associated Advertising Clubs of the World are holding their annual convention at New Orleans on September 21 to 25. The purpose of the convention is to swap ideas, information and impressions and to gain a little more inspiration from other men who are succeeding.

All business men and women are invited to attend, for the Associated Advertising Clubs is an educational body, seeking to render advertising more useful to the business man and to the public, through the co-operation of those interested in the science of "making known."

How can advertising be applied to the problem of industrial unrest?—that will be the great compelling theme of this meeting. It is a subject which interests everyone who seeks to sell things, because continued prosperity depends primarily upon increased production. Advertising can help solve this problem in two ways: (1) by bringing worker and employer closer together through a mutual understanding, and (2) as a tool for the creation of the bigger markets that will be required for the increased production that will be a natural result of a better understanding between the two great elements of industry.

Practical help for the business man who now uses advertising and for him who has seen others use it, and who believes he could do likewise with similar profit, will run through every division and every phase of this Convention. The user of advertising will learn how to perfect his methods, and the non-user will see how others started.

Retailers will find cash-drawer help in a series of talks by Frank E. Fehlman, of New York, who will conduct a Merchandising Institute for three half days of the Convention. His talks will be free to all registered convention visitors. He knows how to make two sales grow where one grew before. He knows how to make other people want to apply his methods and make profits out of them.

Similar help will be available to all buyers and all sellers of advertising space and advertising services. All phases of all kinds of advertisng will be treated.

Pocket book value will come from a study of the National Advertising Exhibit, to be held in connection with the meeting. This Exhibit will be arranged for the sole purpose of helping the Convention visitor, and not with a thought of the advertising medium whose space was used.

This exhibit will embrace several complete, successful advertising compaigns, large and small, treating with many kinds of advertising. And each noon during the convention, those who have prepared the campaigns will be on hand to answer questions.

Better profits, good will and other subjects will be exhaustively treated by leaders in the advertising field.

Cascade Tire Orders Machinery

(*Special Akron Correspondence*)

The Cascade Tire & Rubber Company of Ravenna has placed orders for machinery with the Wellman-Seaver-Morgan Company of Akron, and will break ground for its new plant at an early date. It has also placed an order with the Southwark Foundry and Machine Company of Akron for its vulcanizing outfit, and another order with the Akron Foundry and Machine Company for a complete outfit of cores and molds.

Firestone Votes on Large Stock Increases

The National City Company Is Offering the New $10,000,000 Seven Per Cent Cumulative Preferred Stock at 100 and Accrued Dividends —Financial Statement of Company Is Issued

By a vote of the stockholders of The Firestone Tire and Rubber Company, the directors have been authorized to increase the capitalization of the company to $75,000,000.00 from its present capitalization of $15,000,000.00. Of this amount,, $25,000,000.00 will be common stock, and $50,000,000.00 preferred; $40,000,000.00 of the latter will be in seven per cent cumulative non-participating shares.

The increased capitalization as explained by President H. S. Firestone is necessary to carry forward new buildings and expansion projects which will be launched to care for the rapidly increasing business of the company. Only ten million dollars' worth of preferred stock will be sold at the present time. As the needs of the business demand it, more will be placed on sale.

The meeting which was held in the Auditorium of the Firestone Clubhouse was attended by about 1,500 employes of the company who are stockholders. President H. S. Firestone presided and members of the board of directors, which includes Amos C. Miller, L. E. Sisler, J. W. Thomas and J. G. Robertson were on the platform with him. After routine business was attended to, Vice-President Amos C. Miller offered resolutions to increase the capital stock of the company.

The proxies which the stockholders had signed and returned to the directors authorizing President H. S. Firestone or Vice President Amos C. Miller to vote their stock were sufficient to overwhelmingly carry the resolutions. The articles of incorporation were also amended to care for the increase.

After the business meeting President Firestone gave a short address. He said in part:

"This was a great problem for your directors and only after giving the matter most serious thought they decided that it would not be fair to the stockholders of this company or to the public to limit and cut short the natural growth and development which is ahead of us. Many new fields have been opened to us, both in manufacture and sales. As I stated at the last meeting of stockholders, the day is fast coming when competition is going to reduce the tire business to a 'survival of the fittest.' If we are to survive, we must take advantage of every means for effecting savings in our purchases and in our distribution of our products to our customers, and to get this full advantage without jeopardizing our interests by increasing our liabilities. Your directors after a discussion of many plans decided upon the plan submitted to you and which you have confirmed.

"It is less than three years ago when we increased our preferred capital stock from $1,000,000 to $10,000,000. At that time we had no thought of ever using more than $5,000,000 of that $10,000,000 of preferred issue and with that experience and not knowing what the future might bring forth we decided to make our preferred capital stock sufficiently large so that we could issue more at any time without expense and complications and increasing it from the preferred issue from $10,000,000 to $50,000,000. It is necessary to have half as much common stock, therefore it was necessary to increase the common stock issue to $25,000,000.

Sales Increasing

"I know you will be interested to know that our sales from November 1st to September 1st were $69,475,197.14 as against $63,821,046.67 for the same period last year or an increase of 9 per cent. This increase in dollars and cents must be considered along with the fact that we have had a reduction in that period in prices of from 15 to 32 per cent. You might also be interested in our August

H. S. Firestone

sales which were the largest month's sales the company has ever had. An increase over August of last year of $2,456,994.30 or 31 per cent.

"What are we going to do with this additional capital? I will give you concretely what the plans are, but of course in this industrial unrest, where there is so much agitation and good, honest men are following the agitator and demagogue either by choice or necessity and production, both food and manufactured products is being curtailed, it is difficult to look into the future as to just what it holds in store for us, but I am a firm believer that right will win and the future holds the greatest prosperity and happiness for this country. Of course we are going to have some trying and difficult experiences to reach that state, but when we come through we will be a stronger and greater nation.

Enlarge Plant

"Plant 2 was designed for a capacity of 10,000 tires a day but we found that with additional equipment which we have already ordered and which will cost between a million and a million and a half dollars we could increase that capacity to 16,000 tires per day, and to convert Plant 1 from the fabric tires to cord tires and other such changes it required a large investment.

"One of the first things which we are planning to do is to construct a new mechanical building. This building will be 325 feet long and 315 feet deep and it will be so constructed that a part of it will be suitable for the operation of cranes over top of big machine tools and the balance will be occupied by other mechanical trades which do not require the heavy cranes. All of the most modern machines will be installed in this plant. Every detail of light and ventilation will be worked out. Lockers, wash rooms, shower baths and cafeteria facilities will be placed. Adjacent to this main building will be placed a forge shop and pattern storage building. These buildings complete with heat, light and fire protection will cost approximately $400,000. The building now occupied by the Mechanical trades will be used as a raw warehouse for which it was originally designed and constructed.

The National City Company, New York, are offering the new $10,000,000 seven per cent cumulative preferred stock of the Firestone company. The stock is being offered at 100 and accrued dividend. In its circulars the National City Company give the following financial statement for the Firestone Company:

"It has been the aim of the Company to maintain a sound and conservative financial policy. From reincorporation in 1910 to October 31, 1918, the earnings available for common stock dividends have amounted to $25,977,646, out of which cash dividends have been declared and paid in the amount of $5,653,550, the balance $20,324,096 having been retained in the business.

"The following shows the volume of net sales and the net earnings after payment of preferred stock dividends during the last eight completed fiscal periods:

	Net Sales.	Net Earnings.
1918.....	$75,801,507	$4,664,615
1917.....	61,587,219	4,619,298
*1916.....	44,135,326	5,837,021
1915.....	25,319,476	4,447,271
1914.....	19,250,110	3,157,719
1913.....	15,720,907	1,558,059
1912.....	11,688,200	1,126,911
1911.....	7,462,581	566,752

* Fifteen months—end of fiscal year changed from July 31, to October 31.

"The above figures of net earnings after preferred stock dividends are after deduction of all interest charges, Federal and other taxes, and adequate provision for depreciation and other reserves. The annual average of these net earnings for the eight and one-quarter years—1911 to 1918 inclusive—was $3,148,805, or over four and one-quarter times the annual 7 per cent dividend charge on the present issue of 7 per cent preferred stock. The annual average of the net earnings for the three and one-quarter years ended October 31, 1918, was $4,652,592, or over six and one-half times the dividend on the present issue of 7 per cent preferred stock.

"For the nine months, November 1, 1918, to July 31, 1919, the net sales amounted to $59,145,396, and for the month of August, which was the largest in the Company's history, the net sales were over $10,000,000.

New Steel Plant

"The main manufacturing building of this plant will be 860 feet long by approximately 250 feet wide and will be one story in height. The building will be of steel, brick and concrete and in its architecture will conform, as far as possible, to the existing buildings of the tire and rubber company. Immediately in front of the factory will be erected a fireproof reinforced concrete office building. This building will be two stories in height, with a basement under it in which will be located a modern cafeteria for the Steel Product Company's employees. The total cost of this new plant will approximate $1,000,000. It is expected that these buildings will be completed shortly before January 1, 1920."

Freight Car Situation

Complaints are rather numerous in regard to the freight car shortage, but rubber manufacturers are assured by the Director General of Railroads that conditions are improving and that they are more favorable than in recent years prior to the war.

On August 1, 1917, the total car surpluses reported throughout the country were 43,481 cars, whereas on August 1, 1919, the total car surpluses were 107,900. The total number of unfilled car requisitions on August 1, 1917, was 77,257, whereas the total number of unfilled car requisitions on August 1, 1919, was only 19,271.

The number of freight cars in service and not withdrawn for repairs on July 1, 1917, was 1,983,000. The number of freight cars in service and not withdrawn for repairs on July 1, 1919, was 2,065,000.

The very fact of unified control of all the railroads has tended to concentrate the comments upon any inability to perform one hundred per cent of the transportation required, but the foregoing figures show that the situation during and at the end of July, 1919, was very much better than in the corresponding period in 1917. It is believed this fact ought to be borne in mind by manufacturers in appraising the existing car service conditions.

The extent to which freight cars have been repaired in recent months has been the subject of some comment. The number of freight cars repaired and returned to service by months during the present calendar year has been as follows:

January	2,027,992
February	1,747,146
March	1,953,225
April	1,897,698
May	2,039,661
June	2,013,697
July	1,790,097

On account of the fact that the Fourth of July came on Friday this year, and of the proportionately small amount of work done on the following day, the falling off in the number of cars repaired in July as compared with June is clearly explainable. The number of cars repaired per month in May and June kept fully up to the number repaired in January, although in May and June many shops were still working on shorter hours than in January.

Much stress has been laid on the increase in the percentage of cars withdrawn for repairs in the recent months up to and including July. The fact is that this increase in the number of cars withdrawn for repairs has not been due to a falling off in the number of cars repaired, but has been due to a number of complex factors which have arisen from the conditions resulting from the war, from the exceptional pooling of cars during unified control, and from questions arising between the Railroad Administration and the railroad corporations.

The emphasis which has been laid upon the percentage of cars withdrawn from service for repairs is, therefore, misleading, and does not give a correct idea as to the number of cars actually in service. The number of cars actually in service, not including bad order cars, increased from 1,983,000 on July 1, 1917, to 2,065,000 on July 1, 1919.

The Railroad Administration, however, is not content with its ability to point to the fact that transportation service is more favorable than it was two years ago. On the contrary, extraordinary efforts are being put forth to secure the greatest possible improvement. Although the number of cars repaired in May and June, 1919, was fully up to the normal number of cars repaired, the Railroad Administration gave instructions on June 20, 1919, that all car forces be increased to the full standard measure of 48 hours per week and that additional shifts be worked where the additional employes could be obtained and where they could be economically used.

The showing naturally to be expected from the putting into effect of these instructions was hampered in July by the intervention of practically a double holiday and, of course, was temporarily prevented in August by the strikes of a large number of shop employes. Conditions having now been restored to normal, it is expected that these instructions will promptly show a most favorable result. Further than this, the Railroad Administration instructed on August 16, 1919, that all car forces be put on a basis of 54 hours per week. It is believed that this instruction will result in a marked improvement also in the monthly repair of a much greater number of cars than the normal number and will steadily increase the number of cars actually available for service as compared with preceding years.

In addition to this, the Railroad Administration is rapidly getting the benefit of the service of a large number of new cars constructed during Federal control, but whose introduction into service was postponed on account of inability to agree with the railroad corporations as to the acceptance of the cars. This inability has been overcome. Between August 1 and September 6, 23,564 of these cars have been put into service, and they are now coming into service under the spur of recent instructions at the rate of over 900 per day.

New Ten Broeck Plans

The Ten Broeck Tire Co., Louisville, Ky., is equipping to build a fabric tire that will carry an 8000 mile guarantee. The company's distribution plans are changed from those of the past in that Ten Broeck tires hereafter will be marketed through dealers.

This decision was the result of a reorganization that followed the death of the former president, H. L. Lewman, and the resignation of the former manager, W. C. Lewman. Active management of the company now is in the hands of R. J. Garrene, vice-president and general manager, with Walter H. Grote, assistant general manager and factory superintendent, and W. Z. Nedden, general manager of sales. The new president is William Cox.

The plant is being equipped with new machinery and an over-sized type of mold and cord equipment is being installed. With the new equipment, the present production of 500 tires per day can be doubled by the middle of September. One of the features possessed by the plant is the cotton mill in which the fabric for the new tire is produced.

Woman Becomes Advertising Manager

George L. Sullivan for three years advertising manager of the Fisk Rubber Company, has resigned that position to associate himself with the J. Walter Thompson Company of New York on October 1st.

Miss M. G. Webber, who has been a member of the advertising department for a number of years, and who for the past three years has had charge of the outdoor advertising of the company, assumes the position of advertising manager for the Risk Rubber Company.

New Miller Common Stock

With an increase of approximately 56 per cent in sales volume for the first seven months in 1919, as compared with the same period in 1918, the Miller Rubber Co. of Akron, Ohio, shows every indication of shattering all of its previous records when the totals are checked up at the end of this year.

Whereas the company did approximately $16,000,000 business in 1918, a $23,000,000 figure was set for 1919 and, judging from present indications, the latter mark will be passed easily.

The excellent showing made during the first half of the year is revealed in an announcement that has gone out to Miller stockholders advising them of an $800,000 increase in Miller common capital stock. Stockholders are permitted to subscribe to the new stock at $100 par on a basis of one-fifth of their holdings. Miller common has been selling at better than 200 for several months.

"The company's business has expanded so rapidly this year that more capital is necessary and it is for this purpose that the additional stock has been issued," said W. F. Pfeiffer, general manager of the company.

Olier Representative in America

A. Olier & Company of Paris, France, manufacturers of rubber machinery, has sent a representative to this country. Mr. Hug, the representative, is making a trip to the various rubber centers and intends to call on the leading manufacturers of rubber machinery. The firm is represented in this country by the Industrial Foreiegn Sales Company, 72 Trinity Place, New York.

Imports of Scrap Rubber

Imports of scrap rubber during the fiscal year ending June, 1919, amounted to 8,483,383 pounds, valued at $644,480, compared with 13,390,303 pounds, valued at $1,019,222, for the corresponding period ending June, 1918, and 20,517,328 pounds, valued at $1,569,448, for the fiscal year ending June, 1917. During June, 1919, the arivals amounted to 1,030,894 pounds, valued at $74,376, compared with 734,714 pounds, valued at $53,711, for the same month in 1918.

Trans-Pacific Aerial Navigation

(Special Akron Correspondence)

George Hockensmith, formerly at the Goodyear flying field, is one of the promoters of a $1,000,000 Trans-Pacific Aerial Navigation Company, with headquarters at Los Angeles. It is the aim of the new corporation to establish air passenger traffic between Pacific Coast points and the larger Oriental cities.

New Tire Concern

(Special Akron Correspondence)

The Doylestown Tire & Rubber Company, capitalized at $300,000, is the latest entry into the rubber manufacturing field here. D. A. Doyle, Jr., is the incorporator.

Alexandria Cotton Market

The Alexander Cotton Company, Ltd., announces under date of September 9th:

"Our agricultural expert has completed tour and reports generally plant undersized, eight days late. Pink boll-worm considerably less than previous years. Bolls opening well. Expect rather improved yield, about six to six and one-quarter million Cantars depending much on future conditions."

MARKETS

Manufactured Rubber Goods

NEW YORK, September 23, 1919.

Thus far, the rubber industry as a whole has been fortunately free from disastrous labor difficulties, and with the situation in the rubber centres generally quiet, the industry is able to view with equanimity the labor upheavals which have troubled steel manufacturers, transportation companies, and other industries during the past few months. It is hoped that the epidemic of strikes, engineered in many cases by men of dubious repute, will not affect the rubber industry.

Business has been somewhat improved during the past fortnight, according to members of the trade, and conditions are becoming better. Export business continues to be hampered by the low position of the various exchange markets, but it is believed that these difficulties may be somewhat lightened in the near future, as many believe that exchange will not go much lower; indeed, on some exchange it can hardly go lower without becoming a zero.

AUTOMOBILE TIRES

Talk of expansion of the manufacturing facilities of tire manufacturers is being heard of from time to time, and some of the larger companies are floating big stock issues to provide additional working capital with which to enlarge their manufacturing facilities. It is conceded that the output of high class auto tires and tubes is falling considerably below the demand at the present time, and all efforts are being made to increase the supply. Much new capital and new blood is being infused into the industry, the good returns inducing many men to enter this field. Leading companies are still competing keenly with one another in guarantees for mileage, although the general tendency appears to be to get away from actual distance guarantees, stressing quality. Motorists are buying in better quantities now, and it is believed that the present low prices of tires will keep demand steadily increasing, as more and more citizens purchase cars. Many of the war "profiteers" and workingmen who have been drawing big pay during the war are now investing some of their surplus cash in autos, all of which augurs well for the future of the tire industry.

DRUGGISTS' SUNDRIES

Retail druggists are buying sundries in better volume than for some time past, it is reported, and demand is increasing. Most druggists have been carrying light stocks during the past few years, however, due to the unsettled condition of the market, and they are reluctant to anticipate their requirements now on any articles, preferring to buy in a hand to mouth fashion as they go along, instead of stocking up. Export demand for surgical instruments and sundries continues good, despite the exchange rates.

MECHANICAL GOODS

A fair demand for belting has been reported, but trading is still generally quiet. The railroads have not yet shown any inclination to place business with the manufacturers, and no hope of business from this source is held out at present, Congress having failed to take any definite move in the matter of the disposition of the railroads. The marked increase in building operations in the United States, and the rapid expansion of many manufacturing plants, is bringing an increased volume of business in power transmission belting into the hands of manufacturers. Some export call for air-brake coupling and other railroad specialties is noted, and some marine specialties have also been sold. Mining companies are not buying largely.

MISCELLANEOUS PRODUCTS

News of the plan of the Government to sell its surplus holdings of army clothing directly to consumers has been received. This sale will affect the market for rubber raincoats, as the army plans to sell their coats at about $5.50 each, which is considerably more than retail clothiers and haberdashers would charge for the same garment. And as there are some 3,500,000 men, ex-soldiers and sailors, already supplied with raincoats and slickers, the outlook for this article does not appear over-bright this season.

Manufacturers are unable to fill the demand for rubber heels. Some of the specialty companies, making only this product, are able to keep just about apace of their business, but tire manufacturers making heels as a side-line are unable to keep production up to demand. Buying of this article is being greatly stimulated by the high price leather is buying, the superior wearing qualities of rubber heels, together with their comfort, bringing in the business. Fiber soles are also selling well.

Demand for rubber jar rings picked up somewhat towards the close of the preserving season, and more sales were recorded. Business was generally hampered during this season, however, by the shortage of sugar, which prevented many housewives from putting up the quantities of fruits and vegetables they are in the habit of doing.

Cottons, Yarns and Fabrics

NEW YORK, September 23, 1919.

The market has shown a generally erratic condition during the past fortnight, with the weakness in foreign exchange tending to bring the market down, buying being necessarily curtailed by a cutting off of a good part of the export demand. Reports issued by the various companies specializing in the market are quite unfavorable.

Reports received from various points in the South report a slow demand for cotton, with only occasional trade buying. The Gulf storm which wreaked such havoc with life and property in Texas Gulf cities, also did considerable damage to the crop. In addition to this actual damage by the storm, unfavorable weather conditions during the fortnight have caused considerable damage in North Carolina, South Carolina, Tennessee, and the general Eastern district. Army worms and the boll weevil pest continue to cause considerable damage to the crop.

The talk of various Southern growers to combine to hold their cotton for higher, fair prices, has at last materialized, the trade believes. At the annual meeting of the American Cotton Growers' Association, held in New Orleans early in the month, farmers were advised to hold their cotton for a price of from 36 to 40 cents per pound for immediate delivery and for four months ahead. With the farmers generally in a very solvent condition, they are now in a position to enforce their demands for higher prices for cotton. This determination on the part of growers will undoubtedly be a big factor in the market later on in the season.

Buyers are cautious about buying much in the present market, and trade interests are entering the market only after sharp breaks, when it is profitable to stock up. Japanese interests also continue buyers on the breaks. The last estimate of the Government forecasts a crop of 11,200,000 bales, which does not indicate much of a shortage, and the trade in general is keeping a keen watch on developments, and will shape their policies as the situation clarifies.

SEA ISLAND COTTON

Nothing but bad news comes from the Sea Island belt lately. Bad weather conditions this year, combined with the annual visit of the boll weevil pest, have created considerable damage thus far this year, and the damage has been further increased by the invasion of the army worms. It appears that these two insects have dealt the Sea Island cotton growing industry a knockout blow, as many growers are completely discouraged and are turning their hands to the cultivation of some other commodity which will yield them a better return.

EGYPTIAN COTTON

The holdings of old crop Egyption cotton have been well sold up, and reports from Alexandria indicate that not much stock is reaching that port for shipment to the states. Thus far, the supplies of water have been sufficient for irrigation purposes, despite the fact that many tons of water were used by the army. Consumers of the Egyptian fabric are devoting more attention to the possibilities of American-grown Egyptian, that industry being quite a flourishing one in the Southwest.

FABRICS

The market for fabrics has been in an unsettled condition during the past fortnight, and demand has slackened off somewhat. Demand is turning back to normal sources, much of the Government surplus holdings of various fabrics having been disposed of to the regular trade. These goods include airplane cloth, linens, sheetings, and various woolens.

TIRE FABRICS

The market is strongly held, with a good consuming demand. The rapid expansion of tire manufacturing plants is bringing in a better demand for the fabrics, and dealers in these products are watching with interest the formation of new companies and the addition of manufacturing units to the companies already established.

DRILLS, SHEETINGS, AND OSNABURGS

A fair consuming call for drills and sheetings is reported, tire companies being large purchasers in the market at the present time. Buying by the tire trade is one of the big factors in the market now, as this industry is operating at top speed, whereas other consumers of these fabrics are operating in a cautious manner at this time buying goods only as they go along. Prices are generally well held, although the market has fluctuated. For the first time in many months, Fall River mills are soliciting business from the trade. These mills had been booked up to their capacity production during the war and for some time afterwards.

HOSE AND BELTING FABRICS

A fair demand for hose and belting fabrics is reported, manufacturers of mechanicals increasing their production somewhat as the demand for the finished products increases. Makers of belting and packing are doing some export business with South America, and some sales are still being made to Europe, despite the unfavorable exchange rates.

BURLAPS

The demand for burlaps has fallen off somewhat, although there is still a firm tone ruling in the trade. Importers are shading their prices from ½ to 1 cent per pound for future business, it is reported in the trade. According to cables received from a local importer, August shipments of burlap to the United States totaled 65,000,000 yards, while 1,500,000 yards were sent into Canada. These figures are not overly-large for one month's imports, particularly as it is believed they represent the shipments received on both coasts.

TIRE FABRICS

17¼-ounce Sea Island, combed, sq. yd.	1.40@1.55
17¼-ounce Egyptian, combed	1.20@1.30
17¼-ounce Egyptian, carded	Nominal
17¼-ounce Peelers, carded	.85@ .90
17¼-ounce Peelers, combed	1.05@1.15

DUCKS

Single Filling (pound basis)	lb.	Nominal
Double Filling (pound basis)		Nominal

DRILLS

37-inch 2.35-yard	yd.	.27½ @
37-inch 2.75-yard		.24 @
37-inch 3.00-yard		.22½ @
37-inch 3.25-yard		.21½ @
37-inch 3.50-yard		.20 @
37-inch 3.95-yard		.17 @
37-inch 2.00-yard Southern		Nominal
37-inch 2.00-yard Northern		Nominal
40-inch 2.40-yard Southern		Nominal
40-inch 2.40-yard Northern		Nominal
52-inch 1.90-yard Southern		Nominal
52-inch 1.90-yard Northern		Nominal

SHEETINGS

40-inch 2.35-yard	yd.	@
40-inch 2.50-yard		.25¾ @
40-inch 2.85-yard		.22½ @
40-inch 3.00-yard		.23 @
40-inch 3.25-yard		.21 @ .21½
40-inch 3.75-yard		.17½ @
40-inch 3.60-yard		.18 @ .19
40-inch 4.25-yard		.15½ @

Note.—In view of the unsettled conditions prevailing in the market at the present time, the prices quoted above are more or less nominal, and are not guaranteed.

BURLAPS
(Carload lots)

	Per Yard
7 -ounce 40-inch	Nominal
7½-ounce 40-inch	Nominal
7½-ounce 45-inch	Nominal
8 -ounce 36-inch	@
8 -ounce 40-inch	13.75@ 14.00
8½-ounce 40-inch	@
10 -ounce 36-inch	@
10 -ounce 40-inch	17.35@ 17.50
10 -ounce 45-inch	Nominal
10½-ounce 40-inch	17.75@ 18.00

Chemicals and Compounding Materials

NEW YORK, September 23, 1919.

Producers of many lines of chemicals and compounding materials are proceeding systematically in a plan to increase their production to take care of the greatly enlarged demand for their products. During the past two months, demand has increased steadily and has overtaken, and in many cases outstripped, production. Some interests are proceeding cautiously however, acting upon the belief that the present rush of orders will not continue, but is simply the result of the long holding back of orders during the post-armistice period, when the industry of the country was in a very unsettled condition. On the other hand, many of the more optimistic interests in the trade believe that neither the demand nor prices will fall off, and are proceeding in their plans of expansion on this theory.

Price changes since our last report have been negligible. Producers are not taking any chances of cutting the demand by forcing their prices to higher levels, believing that consumers will be unwilling to go much above present figures to obtain goods. This despite the fact that many producers and dealers claim that they are working on a much smaller margin of profit than before the war, in spite of the fact that prices are higher. The only hope held out by these interests is that prices for the raw materials used by them will become more reasonable. So far the danger of foreign competition is not alarming domestic interests to a great extent, although some shipments of various materials have already come forward from Germany, via Rotterdam. Some fair sized shipments of lithopone have come forward from Rotterdam, but these imports are only a drop in the bucket and in no way interfere with domestic producers, who are considerably behind time in deliveries on contracts.

EXPORTS

There is a good demand noted, although the weakness of the foreign exchange markets is playing havoc with exporting business in general. During July there were heavy shipments of vegetable oils, soya bean oil, linseed oil, animal oils, glues, glycerine, dry colors, acids, naval stores, chemicals, etc., sent abroad. Practically every country on the face of the globe is buying some kind of compounding materials in this country.

BENZOL

Demand for pure benzol is constantly on the increase in the United States, and the market is strongly held on the basis of 22 and 27 cents per gallon, top prices being the asking prices of dealers for small quantities, while the inside prices are those asked by the producers. A late dispatch from London reports that the National Benzol Association there is taking steps to standardize the quality of benzol used as a commercial motor fuel. The expansion in the uses of benzol for this purpose is believed to presage an increased export business.

LITHARGE

Domestic consumption of litharge is increasing, and a better demand is reported by sellers, who continue to hold their stock on the basis of 9¾ to 10¼ cents per pound on the spot. Some consumers are buying in larger quantities, putting a little aside in case a railroad strike should cut off shipments.

LITHOPONE

There is an exceedingly firm tone prevailing in the market for lithopone, and keen observers of market conditions express the opinion that prices would be again advanced if producers were not sold ahead on a basis of 7 cents in carload lots. Demand continues to exceed output and producers are endeavoring to speed up production in order to catch up on their contract deliveries. There is some foreign lithopone reaching the market from time to time, but this is not causing any alarm to the domestic producers; on the contrary it relieves them of some of the pressure of consumers who are after stock.

WHITING

There has been no appreciable change in the market for whiting and the market continues strongly held on the basis of $1.15 and $1.20 for commercial, with American Paris white held at $1.50 and $1.75. Consumers are buying in slightly better quantities.

ORANGE MINERAL

There is a steady consuming demand for orange mineral reported, with a steady tone featuring the market, which is held on the basis of 13¼ and 13¾ cents per pound. Labor troubles are reported to be interfering somewhat with production.

BARYTES

There is a steady demand for crude barytes reaching producers from new manufacturers of lithopone, and the market rules firm with quotations unchanged. Thus far, no arrivals of German barytes have been reported, although one shipment is overdue at the time of writing. Dutch lithopone, made from German barytes, has arrived. The automobile industry is a good buyer.

GLUES

There is a good demand for glues reaching manufacturers from the rubber trade, leading interests report. Many manufacturers are well sold up, and are now booking future business.

WAXES

The market has been generally quiet, with prices generally well maintained. Beeswaz has been firmly held under a strong demand, while the market for Carnauba has been weakened by selling pressure by outside interests. Keen competition in this market has resulted in lower prices generally. Ceresin was generally dull, while Japan wax continued dull, with consumers showing little interest in the market.

DRY COLORS

Very little change has been noted in this branch of the market. Demand continues good on practically all lines, with prices well maintained on the established

basis. The demand for blacks continues good, with producers well sold up on all lines, and prices unchanged. The market for blues has temporarily, at least, ceased its fluctuations and remains firm on the quoted basis, with a good buying movement. Browns continue strongly held, while greens rule firm under a steady buying movement. No change in reds has been reported, and the market is well sold up on the quoted basis. Yellows continue quiet, with a fair routine consuming demand reaching producers.

ZINC OXIDE

The market continues firmly held, with prices unchanged on the quoted basis. Thus far producers have not yet shown any signs of taking advantage of the strong market by advancing their prices, but have been content to book business on the basis of 9½ cents for French process red seal, 10½ cents for green seal, and 11½ cents per pound for white seal. Reports from the Western producing district indicate that the first two weeks of September were the most active weeks the market has experienced thus far in 1919, insofar as demand is concerned.

OILS

The market has generally displayed a firm tone, with a good demand noted for practically all grades. Linseed oil is still well sold up with producers offering little, while corn oil is also firm.

MISCELLANEOUS

The markets for leads, both dry and in oil, have been active during the past fortnight, with a strong undertone ruling. China Clay and Blanc Fixe have ruled firm under a good consuming demand. Antimony has been generally quiet, although firmly sustained. Cadmium sulphide has shown a weak undertone, with the market unsettled. Acids have been generally strong.

Prices Current for Chemicals, Fillers, Colors, etc.

Acetone, carlots	lb.	.13½ @	—
Smaller lots	lb.	.15 @	.16
Accelerator, in drums	lb.	.85 @	1.00
Acids, Acetic, 56%	cwt.	6.00 @	6.50
Carbolic, C. P.	lb.	.12 @	.13
Muriatic, 20 deg.	lb.	2.00 @	2.25
Muriatic, 22 deg.	cwt.	2.50 @	2.75
Nitric, 42 deg.	cwt.	7.00 @	8.00
Nitric, 40 deg.	cwt.	6.75 @	7.50
Sulphuric, 60 deg.	ton	17.00 @	18.00
Tartaric, crystals	lb.	.79½ @	—
Aluminum Flake	ton	29.00 @	31.00
Aniline oil, bulk basis, Contract		— @	—
Imported		Nominal	
Domestic		.32 @	.33
Antimony, metal spot	lb.	.08⅝ @	.08¾
Oxide	lb.	.09 @	.11
Sulphuret, red	lb.	.20 @	.21
Sulphuret, golden	lb.	.21 @	.22
Sulphuret, crimson	lb.	.45 @	.50
Needle, powdered	lb.	.09 @	.10
Asbestos	ton	35.00 @	45.00
Asphaltum, Egyptian	lb.	.16 @	.20
Domestic	ton	22.00 @	30.00
Barium sulphate, technical	lb.	.04½ @	.05
Sulphide	lb.	07¼ @	.07½
Barytes, prime white imported	ton	Nominal	
white, domestic	lb.	.30 @	.31
off color, domestic	lb.	.21 @	.24
Southern, f.o.b. mills		21.00 @	—
Western, f.o.b. mills		21.50 @	—
Benzol, pure, bulk	gal.	.22 @	.27
Beta-naphtol, sublimed	lb.	.55 @	.65
unsublimed	lb.	.50 @	.62
Blacks, Drop	lb.	.05½ @	.15
Ivory	lb.	.16 @	.30
Carbon, gas, cases	lb.	.12 @	.25
Lampblack, R. M.	lb.	.15 @	.45
Mineral blacks	ton	35.00 @	45.00
Blues, Prussian	lb.	.65 @	.75
Soluble	lb.	.68 @	.78
Ultramarine	lb.	.12 @	.40
Browns, Umber, Turkey, burnt, powdered	lb.	.05 @	.06½
American, burnt	lb.	.03½ @	.04
Cadmium sulphide, yellow	lb.	1.50 @	2.00
Carbon, disulphide, bulk	lb.	.07 @	.07½
tetrachloride drums	lb.	.13¼ @	.14
Caustic Soda, 76@78%	cwt.	3.25 @	3.50
Chalk, precipitated, extra light	lb.	.05½ @	.06½
light	lb.	.05 @	.06
heavy	lb.	.05½ @	.06
China clay, domestic	ton	8.50 @	20.00
imported	ton	18.00 @	23.50
Fossil flour	lb.	.03¾ @	.05
Gilsonite	ton	47.50 @	60.00
Glue, extra white	lb.	.35 @	.40
medium	lb.	.30 @	.35
low grade		.20 @	.25
foot stock		.13 @	.18
brown foots		.12 @	.16
common bone		.11 @	.15
Glycerine, C. P. (drums)	lb.	.20 @	.21
cans		.21½ @	.22
second hands		— @	—
Graphite, flake (bbl.)	lb.	.14 @	.25
powdered (bbl.)	lb.	.05 @	.10
Green, chrome, R. M.	lb.	.35 @	.40
Ground glass (fine)	lb.	.03½ @	.04
Hexamethylene	lb.	.90 @	1.00
Infusorial earth, powd'd.	lb.	.02 @	.035
bolted	lb.	.035 @	—
Iron oxide, red, reduced grades	lb.	.07 @	.08
red, pure, bright	lb.	.15 @	.20
Lead, red, dry (casks)	lb.	.10¼ @	.10½
sublimed	lb.	.09¼ @	.09¾
white, basic carb	lb.	.09 @	.09½
white, basic sulp	lb.	.08¼ @	.08½
Lime flour	lb.	.01¾ @	.02
Litharge (casks)	lb.	.09¾ @	.10½
English	lb.	*.12 @	.13
Lithopone, domestic,bbls.	lb.	.07 @	—
in bags	lb.	.06⅞ @	—
Magnesia, carbonate	lb.	.12½ @	.13½
calcined light	lb.	.65 @	.75
Magnesite, calcined,pwd.	ton	50.00 @	65.00
Mica, powdered	lb.	.04¾ @	.05
Mineral rubber (asphal-			
Naphtha, motor gasoline, (steel bbls.)	gal.	.23½ @	—
68 @ 70 degrees (steel bbls.)	gal.	.30½ @	—
70 @ 72 degrees (steel bbls.)	gal.	.31½ @	—
73 @ 76 degrees (steel bbls.)	gal.	.33½ @	—
machine (wood bbls.)	gal.	.36½ @	—
Oil corn, crude factory	lb.	.16 @	—
corn, refined (bbls.)	lb.	.24 @	—
linseed (bbls.) Oct.-April		1.89 @	—
in carloads, spot		2.12 @	—
tank cars		2.17 @	—
Oil palm, Lagos	lb.	.17 @	.18
Niger		.16 @	.16¼
pine, yellow	gal.	.87 @	—
rapeseed, refined	gal.	1.58 @	1.60
rapeseed, blown	gal.	1.65 @	1.75
rosin, first rectified	gal.	.88 @	—
second run		.92 @	—
tar (commercial)	gal.	.36 @	.38
Orange mineral, American	lb.	.13¼ @	.14¼
imported	lb.	.15 @	.20
Paraphenylenediamine	lb.	2.90 @	3.40
Petrolatum, bbls., amber	lb.	.07½ @	.08
pale yellow	lb.	.06 @	.07
Pine tar kiln	bbl.	12.00 @	12.50
Pitch	bbl.	8.00 @	8.25
Plaster of paris	bbl.	2.00 @	3.00
Red Tuscan	lb.	.22 @	.30
Indian (reduced)	lb.	.14 @	.16
Standard	lb.	.12 @	.16
Rosin (common to good)— 280 lbs	bbl.	17.35 @	—
Rotten stone, powdered	lb.	.02½ @	.04½
Rubber, substitute, black	lb.	.13 @	.17
white	lb.	.15 @	.24
brown	lb.	.20 @	.25
Shellac, fine orange	lb.	— @	—
T. N.	lb.	1.25 @	—
Bleached ordinary	lb.	1.50 @	—
Bleached bonedry	lb.	1.30 @	1.35
Silex (silica)	ton	22.00 @	40.00
Soapstone, powdered	ton	12.00 @	17.50
Starch, corn, powd.	cwt.	5.62 @	—
pearl		5.37 @	—
Jap. potato	lb.	.09⅝ @	.09⅝
Sulphur, crude	ton	*50.00 @	—
100 pounds		3.20 @	4.25
roll		2.70 @	3.15
commercial superfine		2.50 @	—
Talc, American	ton	20.00 @	40.00
French	ton	*30.00 @	35.00
Toluol, pure, in drums	gal.	.25 @	.30
commercial		.22 @	.27
Tripolite earth	lb.	.01½ @	—
Turpentine, pure gum— spirit	gal.	1.63 @	—
wood	gal.	1.58 @	—
Venice, artificial	gal.	.14 @	.15
true		4.50 @	—
Vermilion, English	lb.	1.40 @	1.45
American		.25 @	.30
Wax, beeswax, crude yel.	lb.	.44 @	.45
refined		.48 @	.49
Bayberry		.50 @	.53
ceresin, white	lb.	.15 @	.16
yellow		.14 @	—

* Boiled, 5 barrels or more, 2c extra.
Double boiled, 5 barrels or more, 3c extra.

Crude Rubber

NEW YORK, September 23, 1919.

The market for crude rubber has been in an unsettled condition during the past fortnight, and fluctuations, brought about by speculative buying and selling have been frequent. Reports from primary markets tend to strengthen the market, but the local market has not yet reflected much of this firmness since the sharp advances recorded early in the month. Domestic buyers of the crude are not inclined to buy ahead, and are taking stock only in a hand to mouth fashion, buying only to cover their immediate requirements.

Cables received from the Far Eastern markets report an extremely firm tone in all dealings in primary markets, and planters are holding their stock for higher prices, offering only in light volume. Reports of the great expansion of the tire business in the United States, as well as the developments in other industries using rubber, are believed to be the cause for the stand taken by the planters.

	Cents per pound.		
Para—Up-river fine	54¾ @	55
Up-river medium	52 @	....
Up-river coarse	33 @	33½
Caucho ball	33 @	....
Islands fine	48 @	....
Islands coarse	22 @	22½
Cameta	22½ @	....
Madeira fine	62 @	....
Knapsack	73 @	....
Ceylons—Smoked sheets, ribbed	50 @	50½
Smoked sheets, plain	46½ @	47
First latex pale crepe	51 @	....
Amber crepe	Nominal.	
Clean brown crepe	54 @	....
Rio Nunez string	55 @	....
Palembang	14 @	....
African	38 @	....
Prime Surinam sheets	1.02 @	....
Centrals—Corinto prime	34 @	....
Esmeralda, prime	34 @	....
*Balata sheets	1.00 @	....
Guayule, wet	25 @	27
Balata, block, Panama	42 @	43

* Nominal.

Scrap Rubber

NEW YORK, September 23, 1919.

The market for scrap rubber has been generally following the market for crude, advancing with advances in the market for new stock, and receding correspondingly. There has been, on the whole, a good demand during the past fortnight, with consumers buying of the waste material on the advances in crude.

	Cents per pound.		
Boots and shoes	8.00 @	....
Arctics, trimmed	6.00 @	6.25
Arctics, untrimmed	4.50 @	5.00
Tires—Automobile	3.75 @	4.00
Bicycles, pneumatic	2.50 @	3.00
Mixed hose	1.75 @	...
Air brake	2.75 @	3.00
Inner tubes, No. 1	20.00 @	21.00
Inner tubes, No. 2	10.00 @	11.00
Red tubes	9.50 @	10.00

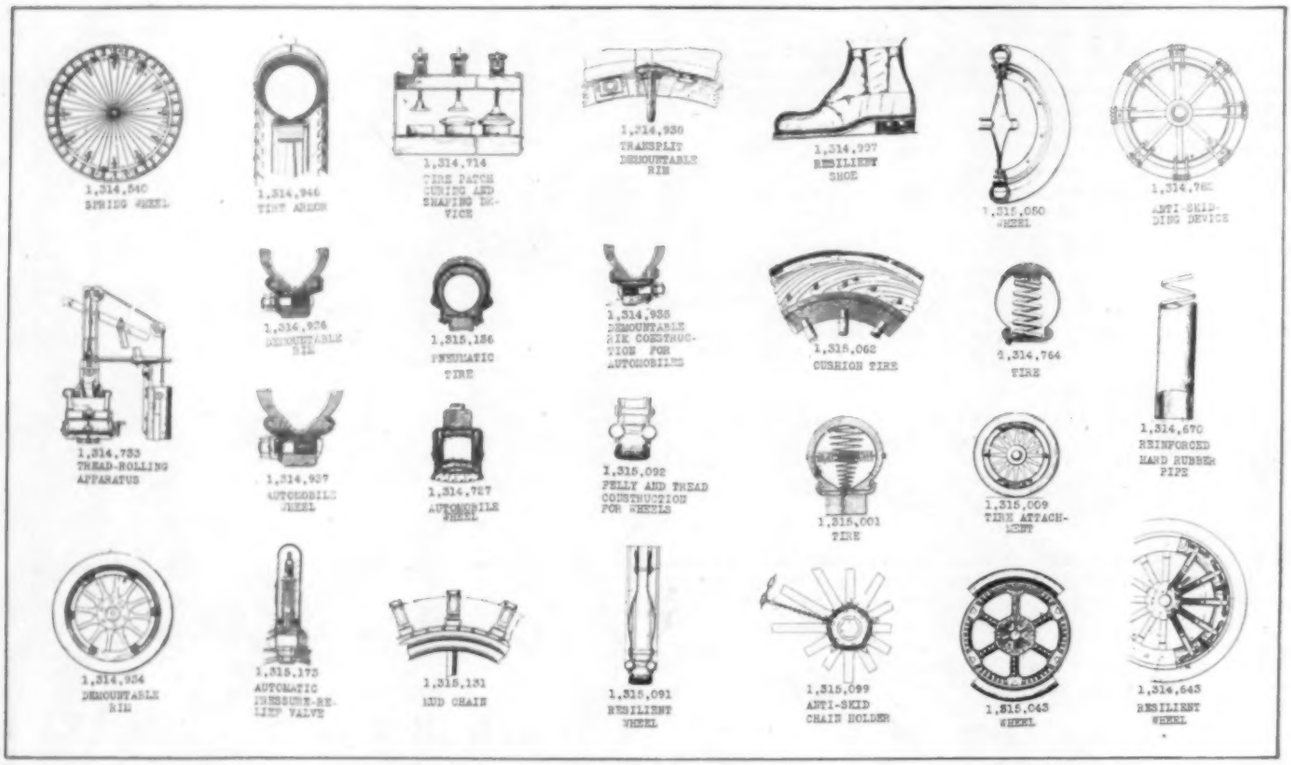
American Rubber Patents

ISSUED SEPTEMBER 2, 1919

1,314,540—Wallace M. Schrock, Jeannette, Pa. Spring Wheel.
1,314,643—Samuel Grossman, New York, N. Y. Resilient wheel.
1,314,650—Edward E. Holt, Chicago, Ill. Tire valve and the like.
1,314,670—Walter H. Juve and Harry A. Hoffman, Akron, O. Reinforced hard-rubber pipe.
1,314,714—Andrew J. Stephens, Kansas City, Mo. Tire-patch curing and shaping device.
1,314,727—August W. Althoff, Oklahoma, Okla. Automobile wheel.
1,314,733—Francis B. Converse and James L. Butler, Akron, O. Tread rolling apparatus.
1,314,764—Guy Stever, Akron, O. Tire.
1,314,782—Francistek Aufinger, Braddock, Pa. Anti-skidding device.
1,315,131—George F. Kaupp, Aberdeen, S. D. Mud chain.
1,315,136—Paul S. Lietz, Chicago, Ill. Pneumatic tire.
1,315,147—Harold R. Morgan, Kalona, Ia. Tire holder.
1,315,173—Luther Marion Wampler, Liberal, Kan. Automatic pressure-relief valve.
1,315,178—George Gardner Buckland, San Francisco, Cal. Wheel.
1,315,184—Joseph C. Fuller, Sewaren, N. J. Fastening means for demountable rims.

ISSUED SEPTEMBER 9, 1919.

1,315,199—Arthur James Anderson, Binford, N. D. Demountable rim for motor vehicles.



1,314,930—Erle King Baker, Chicago, Ill. Pneumatic tire casing.
1,314,931—Erle King Baker, Chicago, Ill. Process of making pneumatic casings or the like.
1,314,932—Erle King Baker, Chicago, Ill. Demountable rim.
1,314,933—Erle King Baker, Chicago, Ill. Demountable wheel rim.
1,314,934—Erle King Baker, Chicago, Ill. Demountable rim.
1,314,935—Erle King Baker, Chicago, Ill. Demountable rim construction for automobiles.
1,314,936—Erle King Baker, Chicago, Ill. Demountable rim.
1,314,937—Erle King Baker, Chicago, Ill. Automobile wheel.
1,314,938—Earl King Baker, Chicago, Ill. Transplit demountable rim.
1,314,946—Roady A. Champion, Denison, Ga. Tire armor.
1,314,997—George J. Winter and Charles S. Diebolt, Buffalo, N. Y. Resilient shoe.
1,315,001—William Ashcroft, Garson Quarry, Manitoba, Canada. Tire.
1,315,009—George W. Clements, Detroit, Mich. Tire attachment.
1,315,012—José De Acuña, Madrid, Spain. System of elastic wheels for all classes of automotors or towed vehicles.
1,315,043—William Seidel, Chicago, Ill. Wheel.
1,315,050—William B. Stout, Detroit, Mich. Wheel.
1,315,055—James Alfred Thomas, Longview, Tex. Spring wheel.
1,315,062—William E. Walker, Cottage Grove, Ore. Cushion tire.
1,315,091—William G. Chipley, Omaha, Neb. Resilient wheel.
1,315,092—William G. Chipley, Omaha, Neb. Felly and tread construction for wheels.
1,315,099—George B. N. Dow, Manchester, N. H. Antiskid chain holder.
1,315,240—Nils M. Rosendahl, Kennett Square, Pa. Tire-holder.
1,315,278—Clyde L. Bridges, Altus, Okla. Wheel-tread.
1,315,291—William Dukes, Birmingham, England. Road vehicle wheel.
1,315,292—Thomas Dunn, London, England. Pneumatic tire tread.
1,315,343—Joseph W. Shipley, Washington, D. C. Spring wheel.
1,315,364—Frederick S. Dickinson, New York, N. Y. Method of constructing pneumatic tires.
1,315,366—Joseph F. Herman, Washington, D. C. Antiskidding chain for wheels.
1,315,471—Hermann Dalwigk, San Antonio, Tex. Wheel tire.
1,315,482—Charles Francis Dyer, Brooklyn, N. Y. Resilient wheel.
1,315,515—Charles W. Kohler and Frederick Martin, Akron, O. Gas mask.
1,315,598—Fred Fisher, Ironton, Mo. Armored penumatic tire.
1,315,626—William Gerwien, San Francisco, Cal. Resilient tire.
1,315,652—Edward F. Aycock, Midlothian, Tex. Process of making tire fillers.
1,315,688—George W. Smith, Dallas, Tex. Tire traction lug.
1,315,710—Arthur Alexander Crozier, London, England. Process for making pneumatic tires.
1,315,731—Arthur B. Low, Denver, Colo. Vulcanizer.
1,315,763—Charles T. Dickey, Elizabeth, N. J. Apparatus for producing waterproof felt.
1,315,778—Henry P. Kraft, Ridgewood, N. J. Dust cap.
1,315,837—Charles E. Hopkins, Washington, D. C. Resilient tire.
1,315,866—William Schwartz, Scottdale, Pa. Antiskid chain.

Among Retailers

The Mills Tire Company, Raleigh, N. C., will erect a new building on Wilmington and Davie Streets. The structure will cost approximately $5,000.

The Power Rubber Company, San Francisco and Oakland, Cal., has opened a branch at 1230 Eye Street, Fresno, Cal.

The Manitowoc Tire Shop, Manitowoc, Wis., owned and managed by Andrew Beck, has moved shop and office into the former Hagen Garage building on Jay Street.

S. E. Whitnall and Carl Reinhart have incorporated the Whitnall Tire Company, Milwaukee, Wis., with a capital stock of $5,000 to engage in the tire and repair business.

Louis Longrie and Thomas Kelly have purchased the Hub City Vulcanizing Company, Milwaukee, Wis., which is now to be known as Longrie & Kelly. George F. Wacker, the former owner, will retire.

Spade's Vulcanizing Shop, Grand Rapids, Mich., has installed a 200-ton truck tire applying press and will carry a full line of Goodyear truck tires. This company formerly catered to the passenger car trade exclusively.

Both retail and wholesale business will be done by the Arkansas Tire Company, Little Rock, Ark., which was recently opened. R. E. Shook will be manager.

The Harry Street Tire & Rubber Company, Kansas City, Mo., has leased quarters at 1314 McGee Street, that city, for use as sales and service rooms for "Bull" tires.

The Lanpher Motor Car Company, Joplin, Mo., will erect a fireproof service station and will handle Goodyear truck tires for which they are distributors for Joplin.

Hale & Son, Dodge City, Kan., have opened a wholesale and retail automobile tire house at 113 West Chestnut Street.

The Welch-Kelly Tire Company, Kansas City, Mo., will open a shop to handle tires and supplies.

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which includes the cooperation of technical experts and large laboratories. This service is at your command.

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ZINC OXIDE
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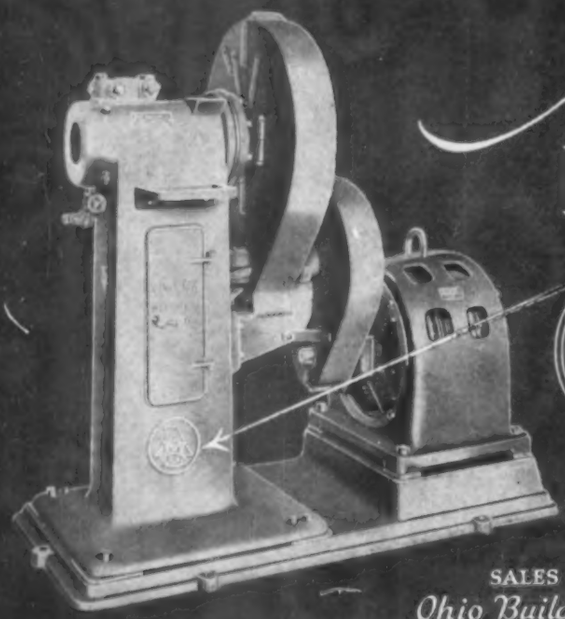

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Standard Tuber Sizes
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A cupped head which holds the nail set in place while the worker drives the nail.

A centre stick point gives additional holding powers because it always clinches with a curl.

A corrugated shank also adds to its holding strength.

There are many other nails and tacks in the K-K Line used in the rubber and fibre trade.

THE COMPLETE K-K LINE

K-K Channel Nails
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K-K Tapping Nails
K-K Shoe Nails
K-K Slivers
K-K Soling Nails
K-K Pegging Nails
K-K Curl Nails
K-K Curl Rubber Heel Nails
K-K Cobbling Tacks
K-K Shank Tacks
K-K Quilting Tacks
K-K Miners' Tacks
K-K Hob Nails
K-K Shoe Rivets
K-K Kup Head Rubber Heel Nails
K-K Rubber Top Lift Nails
K-K Wood Heel Attaching Nails

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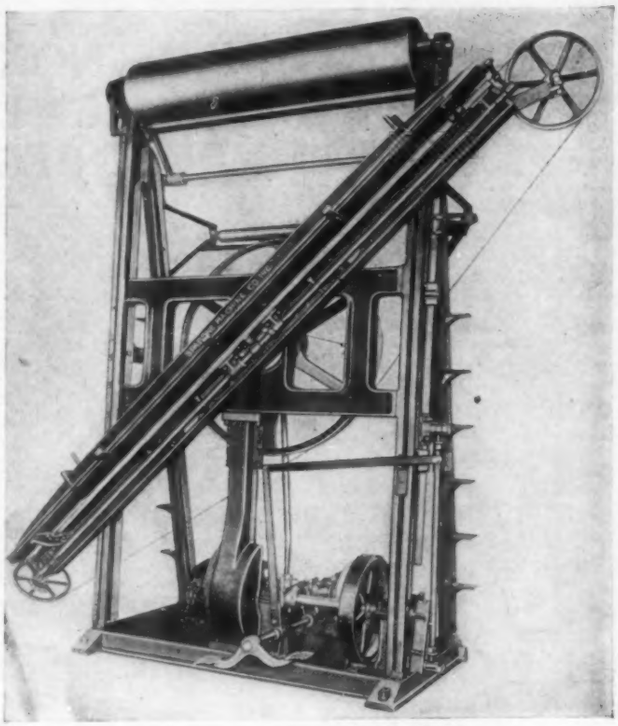

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If quickness in adjustment is wanted,
If accuracy is wanted,
If low cost of operation is wanted,
If efficiency is wanted,
If simplicity is wanted,
If floor space is wanted,

Then Install This Remarkable Bias Cutter

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IMPORTERS

Crude Rubber

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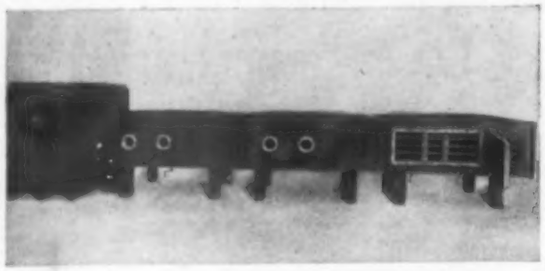

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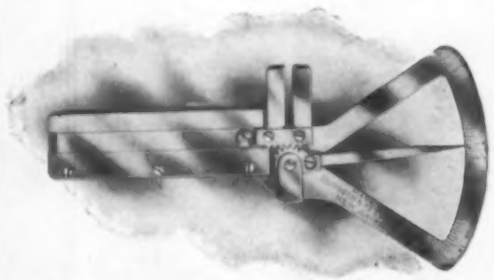

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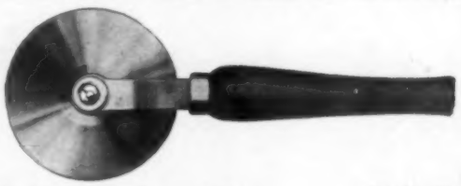

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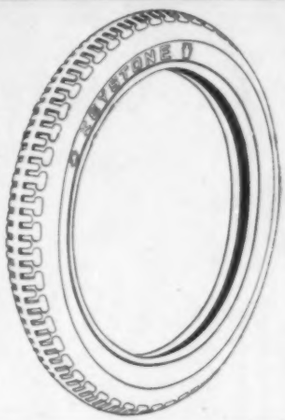

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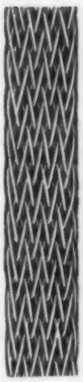

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